Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

Review of the Commission's Rules Regarding the Pricing of Unbundled Network Elements and the Resale of Service by Incumbent Local Exchange Carriers	)	WC Docket No. 03-173

DECLARATION OF JOSEPH P. RIOLO

ON BEHALF OF AT&T CORP.

December 16, 2003

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DECLARATION OF JOSEPH P. RIOLO

1. My name is Joseph P. Riolo. I am an independent telecommunications consultant. My business address is 102 Roosevelt Drive, East Norwich, NY 11732.

2. I have been an independent telecommunications consultant since 1992. As a consultant, I have submitted expert testimony on matters related to telephone plant engineering in California, Delaware, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, New Jersey, New York, Ohio, Pennsylvania, Virginia, West Virginia, Wisconsin, District of Columbia, and the FCC.

3. I have personally engineered all kinds of outside plant, including underground, aerial and buried plant, in urban, suburban and rural environments. I have engineered copper and fiber plant as well as provisioned analog and digital services. I have participated in the design, development and implementation of methods and procedures for engineering planning, maintenance and construction. I have placed cable (both copper and fiber), spliced cable (both copper and fiber), installed digital loop carrier, tested outside plant and performed various installation and maintenance functions. I have prepared and awarded contracts for the procurement of materials. I have audited and performed operational reviews relative to matters

of engineering, construction, assignment and repair strategy in each company throughout the original Bell System.

4. I have directed operations responsible for an annual construction budget of $100 million at New York Telephone Company. My responsibilities included, but were not limited to, engineering, construction, maintenance, assignment and customer services. Further detail concerning my education, relevant work experience and qualifications can be found in Attachment A to this testimony.

I. PURPOSE AND SUMMARY OF DECLARATION

5. The purpose of this Declaration is to respond to certain issues raised in the Commission's Notice of Proposed Rulemaking ("*Notice*" or "*NPRM*") regarding cost inputs, high-capacity loops, and network routing and construction. Part II of this Declaration discusses the questions raised in the *NPRM* regarding fill factors. An efficient carrier in a forward-looking network would maximize utilization of its facilities to the greatest extent possible to avoid the substantial costs of idle capacity. Although an efficient forward-looking network will contain spare capacity to meet current demand (*i.e.* capacity attributable to churn and defective equipment), the availability of spare capacity resulting from breakage (the increase in cable size due to cable manufacturing constraints) should be recognized when setting a cable sizing factor because it contributes to the achieved fill factor.

6. The spare capacity attributable to breakage that is built into most cost models may be sufficient to cover the relatively modest amounts of spare capacity required for churn and

defective equipment. And, in no events, should current ratepayers bear the cost of any additional capacity that an efficient carrier claims is necessary to meet future growth. The costs of any future growth capacity must and should be borne by the future ratepayers on whose behalf such capacity is built.

7. Part III addresses the structure sharing between the incumbent local exchange carrier ("ILEC") and utilities or other LECs that should be reflected in a forward-looking cost model. Given the high costs of construction, an efficient carrier would have strong economic incentives to maximize its opportunities to participate in structure-sharing arrangements. Moreover, the incumbents' arguments in state proceedings that structure sharing will be *de minimis* and virtually impossible to coordinate in the forward-looking network are belied by: (a) the 1996 Act which requires nondiscriminatory access to poles, conduits, and rights-of-way; (b) the plethora of state and local ordinances, codes and regulations that require or strongly encourage structure sharing; (c) the incumbents' own memberships in utility coordinating committees, which are designed to facilitate joint use arrangements; and (d) the substantial opportunities for structure sharing that exist today and which should only increase as companies seek ways to reduce the substantial costs associated with facility placement.

8. Part IV discusses the need for the ILECs to provide accurate line counts, for each type of loop that they serve and by central office, regardless of whether the ILEC is required to provide unbundled access to particular types of loops as a result of the Commission's rulings in the *Triennial Review Order*. In any ILEC's network, two-wire loops share a significant number of facilities with high-capacity loops, including DS-1 loops, DS-3 loops, and OCn loops. All of

these loops are capable of transmitting packetized information for DSL access and high-speed Internet access, as well as providing voice service. Because of the substantial shared costs of the facilities shared by these loops, the ILECs must be required to provide accurate line counts so that an appropriate assignment of costs can be made among such loops – and the forward-looking costs of such loops can be calculated accurately.

9. Part V responds to the issue, raised in the *NPRM*, of whether the Commission should extend the existing "scorched-node" assumption of existing switch locations to other parts of the network, including existing feeder routes and existing remote terminal locations. The "scorched-node" assumption should not be expanded as the Commission proposes, because an efficient carrier entering the market today would not use the same serving areas, SAIs, FDIs, and remote terminals as those in the ILEC's inefficient embedded network. Currently available technology would enable a new entrant to construct larger serving areas, and to serve existing customers less expensively using fewer remote terminals and feeder routes to connect them to the serving central office. Thus, extending the "scorched-node" assumption beyond its current scope would reflect the inefficiencies of the ILECs' current networks, thereby overstating forward-looking costs.

10. Finally, Part VI responds to the *NPRM*'s question of whether, and how, ILECs may recover charges for conditioning loops. Any separate charge for loop conditioning would not reflect a forward-looking network. Network guidelines that have been in effect for more than 20 years have called for a loop architecture that does not deploy load coils, excessive

bridged taps or repeaters on cable pairs. The need to "condition" loops simply reflects the ILECs' failure to follow these guidelines and, thus, the inefficiency of their embedded networks.

II. FILL FACTORS

11. Fill factors or utilization rates "represent[ ] the percentage of the capacity of a particular facility or piece of equipment that is used on average over its life." *NPRM* ¶ 73. A high fill factor means there is little idle capacity; low fill means there is a larger amount of idle capacity. Because fill factors directly affect the amount and carrying costs of investment in spare capacity, they are a critical input in the proper development of forward-looking loop costs.

12. The *Notice* requests comment on: the guidance the Commission should give state commissions on setting fill factors; whether the incumbents' embedded fill factors are relevant or dispositive in determining forward-looking costs; whether fill factors are likely to vary with changes in demand; whether fill factors are different in competitive or monopoly markets; the factors that states currently evaluate in determining fill factors; and the evidence or data that should be considered if embedded fills are not dispositive in establishing forward-looking utilization rates. *See NPRM* ¶¶ 74-75.

13. Idle spare capacity generates no revenue and is, as a consequence, quite costly to deploy. Thus, if unreasonably low fill factors are used in cost modeling, UNE rates will be artificially inflated. As a matter of pure logic, an efficient carrier in a forward-looking network would maximize capacity utilization to the greatest extent possible to avoid the costs of unused, non-revenue producing capacity. It is indisputable that an efficient forward-looking network

will contain some spare capacity to serve current demand which, by definition, includes capacity for churn and maintenance attributable to defective equipment. Importantly, however, in an efficient, forward-looking network, the relatively modest amounts of spare capacity required for churn and maintenance may often be sufficiently accounted for as a result of "breakage" – the increase in cable size caused by cable manufacturing constraints.

14. Invariably, the incumbents attempt to bolster their extravagantly low proposed fill rates on the theory that large amounts of spare capacity are needed to serve future, "ultimate" demand in accordance with engineering guidelines. These arguments founder on a number of fronts. The Commission has already determined that fill factors should be based on current, rather than ultimate or future demand. The incumbents' arguments are also belied by their own engineering practices, which encourage the maximization of outside plant to the greatest extent possible. Indeed, the incumbents' arguments conveniently ignore that their own engineers are not constrained by engineering guidelines, and that they routinely exercise their own sound judgment in determining optimal plant capacity.

15. Moreover, as explained in the Willig Declaration, even assuming for the sake of argument that an efficient, forward-looking carrier would opt to build spare capacity today for future growth, it is not appropriate for current ratepayers to bear the costs of this growth capacity. For UNE costing, there is a critical distinction between engineering design and cost attribution. The amount of spare capacity that an engineer would include in the design of outside plant is not equivalent to the amount of unused capacity properly charged to current ratepayers. And, critically, current ratepayers should not be required to subsidize the future customers on

whose behalf future growth spare capacity is built. The costs of spare capacity for future growth must and should be incurred by future ratepayers.

16. The incumbents' actual or embedded fill factors are irrelevant and most assuredly are not dispositive in establishing the utilization rates that would prevail in a forward-looking market. The incumbents' existing networks, which have been cobbled together in a piecemeal fashion over the past 100 years, reflect a host of inefficiencies that have resulted in excessive amounts of spare capacity. As a consequence, the incumbents' embedded fill factors cannot properly be used as valid benchmarks for efficient, forward-looking costs.

17. The fill factors that have been established by state commissions have varied widely. In state UNE proceedings, state commissions have adopted the lower fill factors proposed by incumbents, selected the higher fill factors proposed by competitors, or arbitrarily "split the baby," rather than determine TELRIC-compliant fill factors. In all events, an assessment of forward-looking appropriate fill factors for different portions of the outside plant network requires careful consideration of a wide range of issues—including, but not limited to, the impact that technological advances and the stagnant growth of switched access lines has had and will have on the outside plant planning process.

18. A number of documents are highly relevant and should be produced by incumbents so that the parties and the state commissions can properly evaluate these issues. These documents include the incumbents' engineering guidelines and feeder and distribution relief jobs which identify the utilization rate at the time of relief of the feeder and distribution cable. Although the incumbents have generally objected to the production of the latter, the data

they contain are highly probative in testing incumbents' assertions about their own actual utilization rates, which they invariably and improperly use as a proxy for forward-looking fill factors. Furthermore, these documents can provide a useful framework for evaluating the factual underpinnings of the incumbents' claims about the size and purported reasons for the spare capacity in their cost models. Thus, the Commission should mandate that, in any state UNE proceeding, an incumbent is obligated to provide these documents to the state commission and the CLECs promptly after institution of the proceeding.

A. Types of Spare Capacity

19. The *Notice* asks for guidance that should be given to state commissions in establishing fill factors. As a preliminary matter, the efficient level of spare capacity in a forward-looking network necessarily depends upon a number of factors that may vary substantially from state to state. Generally, the incumbents argue that substantial amounts of spare capacity are required for churn, maintenance, breakage, and future growth. As explained in more detail below, however, the relatively modest amounts of spare capacity that are required for churn and maintenance can largely be accounted for by breakage. Moreover, to the extent that an efficient carrier determines that it is more cost-effective to stockpile spare capacity today to accommodate future growth, the costs for that future growth capacity should not be borne by current ratepayers.

1. Churn – Related Spare Capacity

20. In state UNE proceedings, the incumbents have defended their low utilization rates on the ground that "churn" or "demand uncertainty" – which occurs when existing

customers relocate or change the number of facilities they require at a particular location or on a given route – requires significant spare capacity, which in turn automatically results in a downward adjustment to utilization rates.[1] This is unfounded. All carriers must maintain a certain amount of spare capacity to handle variations in demand attributable to the movement of customers from one location to another. As the *Virginia Arbitration Order* found, however, it cannot properly be assumed "that there is a negative correlation" between such demand fluctuations and outside plant fill factors.[2] In bolstering this position, the Wireline Competition Bureau pointed out that, although it is possible that competition may result in increased variations in demand, it is equally possible "that a competitive market would develop more efficient mechanisms to respond to these fluctuations (*e.g.* more creative marketing and pricing strategies, more flexible network architecture)."[3]

21. In fact, the amount of spare capacity required for churn is relatively small. A significant amount of churn is essentially self-canceling, resulting in no change in demand, as customers move in and out of locations or move to locations that are served by the same central office or distribution terminal. For example, when a residential customer vacates the premises, the facilities are typically left in place – a condition that is referred to in the industry as "cut-through" pairs. More often than not, the line remains active on a limited basis to allow the new

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[1] *See, e.g.,* Memorandum and Order, *In the Matter of Petition of WorldCom, Inc., et al., Pursuant to Section 252(e)(5) of the Communications Act for Expedited Preemption of the Jurisdiction of the Virginia State Corporation Commission Regarding Interconnection Disputes with Verizon Virginia Inc., and for Expedited Arbitration*, CC Docket Nos. 00-218, 00-251 (released Aug. 29, 2003) ("*Virginia Arbitration Order*") ¶ 249.

[2] *Id.*

residential customer to call 911 or order new service. Likewise, spare capacity requirements for non-residential customers should be relatively modest. Generally, loop facilities in central business districts are highly fungible. Furthermore, many non-residential customers own the inside plant – the distribution portions of the plant inside the building. As a result, the churn affecting this privately-owned cabling has no impact on the incumbents' distribution fill and would not be considered for UNE costing purposes.

22. Additionally, strictly from an engineering perspective, churn cannot result in a downward adjustment to the fill rate. Under standard engineering practices, fill is calculated by dividing working pairs, idle assigned pairs (cut-through pairs), and defective pairs by total pairs. Subscriber churn would only change the status of the cable pair in the numerator of the fill ratio from working assigned to idle assigned. Thus, customer churn would not result in a decrease in the utilization rates.

23. Moreover, for voice grade loops for residential customers, churn generally would be confined to demand variations attributable to orders for second or more lines to existing locations. However, the availability of wireless, DSL, and cable modem services, which permit customers to meet both voice and data requirements with a single outside plant facility or cable pair, has effectively reduced demand for additional lines – a fact that at least one incumbent has conceded:

(footnote continued from previous page)
[3] *Id.*

> In the judgment of the Verizon experts, the recent, very significant increase in additional lines per customer (nearly 40%) is an aberration driven by the explosion in Internet use. Other factors such as the introduction of alternative DSL and cable modem service are ultimately expected to reverse this trend.[4]

24. As explained in more detail in Part IV, below, the relatively stagnant growth in switched access lines since 1996 provides further confirmation that wireless, DSL, and other technologies have effectively reduced the demand for wireline service. Against this backdrop, churn should have relatively little effect on the outside plant planning process.

2. Spare Capacity for Defective Equipment

25. Relatively modest amounts of spare capacity would be required in a forward-looking network for maintenance due to defective pairs. In this regard, the embedded networks of the incumbents undoubtedly include cable types that will not be deployed on a going-forward basis—including some cable types (such as pulp-insulated cable, lead cable, and "open wire") that incumbents have not actively deployed for 25 to 50 years. One of the reasons that the incumbents no longer deploy these types of cable is that they typically require substantial and expensive maintenance. For example, one of the disadvantages of pulp-insulated cable (*i.e.* cable insulated with paper) is that it is highly sensitive to humidity, and moisture badly degrades its performance. Similarly, lead sheath cable suffers from expansion and contraction cracks in

[4] Rebuttal Testimony of the Verizon New York Inc. Panel, filed Oct. 19, 2000, in New York PSC Case No. 98-C-1357, *Proceeding on Motion of the Commission to Examine New York Telephone Company's Rates for Unbundled Network Elements*, p. 110-11. *Cf.* Tenth Report and Order*, In the Matter of Federal-State Joint Board on Universal Service*, *Forward-Looking Mechanism for High Cost Support for Non-Rural LECs*, CC Docket Nos. 96-45, 97-160 (Released November 2, 1999), 14 FCC Rcd. 20156 ("*Inputs Order*") ¶ 200.

the metal sheaths. Without substantial maintenance, large portions of these cables will undoubtedly become defective over time, particularly over decades of use.

26. In state UNE rate proceedings, the incumbents have conceded that their embedded networks contain nontrivial percentages of defective pairs.[5] However, the percentage of spare capacity attributable to defective pairs does not provide a reasonable benchmark for the expected level of spare capacity in an efficient, forward-looking network.[6]

27. Today, telecommunications carriers demand reliable equipment that can perform at low rates of failure. In a forward-looking network, there would be substantially more PIC distribution cable, which has a lower rate of failure than the pulp cable frequently found in the incumbents' existing outside plant. Moreover, as a result of advancements in methods and technology for, *inter alia*, splicing, terminal equipment, and Serving Area Concept design that has minimized the need to rearrange copper pairs, the percentage of defective pairs in a forward-

[5] *See, e.g.,* BellSouth's response to Item 30 of AT&T's Second Set of Interrogatories in Georgia Public Service Commission Docket No. 7061-U (noting that BellSouth's copper cable defective pair level is 10.7%).

[6] Invariably, the incumbents derive their "actual" or embedded fill factors by using the following equation: Working Pairs/Available Pairs = Actual Fill Factor. The incumbents typically count defective pairs as "Available Pairs" in the denominator of the calculation. However, the incumbents' calculation is at odds with generally accepted engineering practices. For example, in accordance with the Serving Area Concept ("SAC"), distribution pairs are permanently committed from the interface to each unit. The first pair is designated as the primary pair, the second pair is designated as the permanent secondary pairs, while all other pairs are designated as re-assignable secondary pairs. Each primary and permanent secondary pair is dedicated and permanently entered in the assignments record. However, when calculating fill, engineers typically divide working pairs, idle-assigned and defective pairs (which are in the *numerator* of the fill ratio) by total pairs in the denominator.

looking network should be about one percent. As a result, in a forward-looking environment minimal amounts of spare capacity would be required for maintenance attributable to defective facilities.

3. Breakage-Related Spare Capacity

28. Because manufacturing constraints and inventory costs limit cable to discrete sizes, breakage automatically results in spare capacity (which is also referred to as modularity spare).[7] As the following chart illustrates, most copper cables come in discrete sizes ranging from six to 4200 pairs:

Table 1

Cable Sizes (in pairs)
6
12
25
50
100
200
300
400
600
900
1200
1500
1800
2100
2400
2700
3000
3300

[7] *See, e.g., Virginia Arbitration Order* ¶ 257, n. 674 (noting that "[b]reakage refers to the fact that cable pairs come in discrete sized bundles," and that "[i]n order to provide capacity on a given route, it is necessary to choose a bundle of size greater than or equal to the current demand").

Cable Sizes (in pairs)
3600
4200

29. Because of the discrete sizes in which cable is manufactured, it is often impossible to match available cable sizes with the precise numbers of pairs that are needed to serve a cable route. For example, if 30 loops are required to wire a distribution route, a 50-pair cable would be required, resulting in a fill rate of 60% (30 divided by 50). Similarly, if 57 loops are required for a particular route, the smallest single cable that could serve this demand is a 100-pair cable, resulting in a fill rate of 57% (57/100).

30. Modern cost studies assume the use of actual, currently available equipment for purposes of UNE-pricing. As a consequence, these cost studies automatically capture the substantial amount of spare capacity attributable to breakage. Indeed, as Table 1 illustrates, in virtually all cases, each cable size is at least half as large as the next smaller cable size; and, accordingly, breakage would not cause fill to decline below 50 percent. Thus, although breakage is inevitable, modularity spare should be more than sufficient to cover the modest amounts of capacity required for maintenance, as well as churn.[8] In such circumstances, no additional spare

[8] The cable sizing factor used in costing models is the factor by which cable is increased to assure a sufficient amount of spare capacity above that which is required to serve current demand. Thus, for example, in some states a 75 percent sizing factor has been adopted for distribution cable. A 75 percent cable sizing factor means that each cable that is built by the model will include sufficient capacity to serve 1.333 times current demand. However, the use of a cable sizing factor generates an effective or achieved utilization rate that is less than the corresponding cable sizing factor. In this regard, cost models determine distribution cable pair requirements and then increase the size of the cable in the model by dividing the pair requirements by the distribution cable sizing factor. The model then selects the next larger size cable to meet the distribution pair requirements. Because of breakage, or the need to use the next largest copper distribution cable, achieved fill is always less than the cable sizing factor.

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should be added to the model. Moreover, if the additional spare capacity requirements needed to meet current demand (*i.e*. churn and maintenance) exceed the modularity spare, only that spare capacity that is not accounted for by breakage should be reflected in the cost model.

4. Future Growth-Related Spare Capacity

31. To defend the woefully low fill factors that they have proposed in state UNE proceedings, the incumbents invariably contend that large amounts of spare capacity are required to support future growth or ultimate demand in accordance with their engineering standards. These arguments are fundamentally flawed.

32. Importantly, this Commission has expressly rejected the notion that fill factors should reflect ultimate demand, finding that any such attempt to account for ultimate demand is far "too speculative" and introduces substantial risks of error.[9] As the *Virginia Arbitration Order* found, "[j]ust as the Commission found it inappropriate to include in universal service support the costs of building outside plant to meet uncertain ten- or twenty-year demand projections, it is inappropriate for [the CLECs] to bear the cost today of building plant for uncertain ultimate demand."[10] Similarly, state commissions have rejected the proposed fill factors of incumbents that are based on ultimate demand, finding that "[u]ltimate design theory is

(footnote continued from previous page)
Because breakage also generates substantial spare capacity that is available to accommodate churn and maintenance, the cable sizing factor adopted by state commissions should be limited to the minimal amount of spare capacity that is needed.

[9] *NPRM* ¶ 73 (footnote omitted).

[10] *Virginia Arbitration Order* ¶ 254 (footnote omitted).

an inefficient approach that fails to consider changes and improvements that affect the network today."[11]

33. Additionally, although the incumbents almost uniformly insist that their own ultimate demand engineering standards justify substantial amounts of spare capacity, these assertions are at odds with their own engineering practices, which point in the opposite direction, emphasizing the critical importance of maximizing existing capacity.

34. Moreover, in fielding their ill-conceived arguments, the incumbents inevitably confuse the important difference between engineering design and cost attribution. Even assuming for the sake of argument that an efficient, forward-looking carrier would stockpile extra spare capacity today to satisfy future growth, it does not follow that this is the level of capacity that should be used to set UNE rates. There is a stark and critical difference between appropriate engineering assumptions for capacity design and the appropriate economic assumptions for pricing that capacity.

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[11] Decision and Order, *In the Matter of the Board's Review of Unbundled Network Elements Rates, Terms and Conditions of Bell Atlantic-New Jersey, Inc.*, Docket No. TO00060356, New Jersey Board of Public Utilities (March 6, 2002) ("*New Jersey UNE Order*") at 84. *See also* Order No. 78552, *In the Matter of the Investigation*, *into Rates for Unbundled Network Elements Pursuant to the Telecommunications Act of 1996,* Maryland Public Service Commission, Case No. 8879 (*"Maryland UNE Order"*) at 51 (rejecting Verizon's argument that its "forward-looking network should be constructed to meet ultimate demand"); Phase II Opinion and Order, Decision No. 64922, *In the Matter of the Investigation Into Qwest Corporation's Compliance With Certain Wholesale Pricing Requirements for Unbundled Network Elements and Resale Discounts*, Docket No. T-00000A-00-0194, Arizona Corporation Commission (June 12, 2002) ("*Arizona UNE Order*"), 2002 Ariz. PUC LEXIS 11, *32 (rejecting Qwest's proposed fill factors that were based on ultimate demand).

35. Determining the optimal plant capacity or utilization necessarily involves a trade-off. As the Willig Declaration explains, stockpiling reserve capacity today may avoid the added costs of piecemeal relief in the future, but it will also incur extra carrying costs in the meanwhile. From an economic standpoint, designing effective fill factors also requires an assessment of the additional revenues that are likely to be generated by the additional growth capacity. As Dr. Willig shows, if an efficient carrier determines that it is necessary to design a network today with spare capacity to meet anticipated future growth, the next link in any UNE costing analysis requires an assessment of the costs of the revenue capacity and the present value of the expected revenues from future customers who will be served by such growth capacity. Invariably, in their costing methodologies, the incumbents not only improperly size optimal plant capacity, but they also fail to give today's customers credit for revenues that the incumbents anticipate earning from the future customers whose increased demand purportedly justifies building extra capacity for future growth today.

B. Embedded Fill Factors

36. In state UNE proceedings, the incumbents almost invariably have inflated their estimates of UNE costs with assumptions about facility utilization that reflect the embedded levels of fill in their networks. The incumbent carriers' reliance on their embedded fill levels is improper and unreasonable. To comply with TELRIC, a cost model must establish a proper, forward-looking level of network utilization. As a consequence, "[p]ast practice alone cannot be the basis for setting forward-looking rates as required by the Act."[12] Paragraph 682 of the *Local*

[12] *AT&T Communications of New Jersey, Inc. v. Bell Atlantic – New Jersey, Inc.*, Civ. No. 97-
(footnote continued on next page)

Competition Order requires that fill factors reflect "the total cost of the element" divided by a "reasonable projection of the actual total usage of the element." Accordingly, this Commission, state commissions, and the Wireline Competition Bureau have expressly rejected the attempts of the incumbents to use their actual embedded fills as proxies for TELRIC-compliant utilization rates.[13]

37. The incumbent's embedded fill factors cannot be dispositive in establishing forward-looking costs for several reasons.[14] First, rate of return regulation has given incumbents

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5762 (KSH), slip op. at 34 (D.N.J. June 2, 2000).

[13] *See* Final Decision, *Investigation Into Ameritech Wisconsin's Unbundled Network Elements*, Public Service Commission of Wisconsin, Docket No. 6720-TI-161 (March 22, 2002), 2002 WL 311275002, *70 (accepting fill factors proposed by the CLECs and rejecting Ameritech's proposed fill factors that represented its actual levels of fill); *New Jersey UNE Order* at 84 (rejecting Verizon's proposed distribution fill factor that "is the product of an embedded design that is at least partially the result of an inefficient rate base, rate of return environment"); Memorandum Opinion and Order, *In the Matter of Joint Application by SBC Communications Inc., Southwestern Bell Telephone Company, and Southwestern Bell Communications Services, Inc. d/b/a Southwestern Bell Long Distance for Provision of In-Region, InterLATA Services in Kansas and Oklahoma*, CC Docket No. 00-217 (January 22, 2001) ("*Kansas/Oklahoma 271 Order*") ¶ 79 (rejecting the actual embedded fill factors approved by the Oklahoma Administrative Law Judge, finding that "the ALJ failed to consider whether the actual fill factors were those of an efficient provider"); *Virginia Arbitration Order* ¶¶ 246-249 (rejecting Verizon's fill factors that were based on embedded utilization levels); Opinion, *In the Matter of the Commission Investigation and Generic Proceeding on GTE's Rates for Interconnection Services, Unbundled Elements, Transport and Termination Under the Telecommunications Act of 1996 and Related Indiana Statutes*, Case No. 40618, Indiana Utility Regulatory Commission (May 7, 1998) ("*Indiana UNE Order")*, 1998 Ind. PUC LEXIS 482, *30 (rejecting GTE's actual current fill factor as "inappropriate in a forward-looking cost analysis"); Report and Order, *In Re: Review of Bell Atlantic-Rhode Island TELRIC Study*, Docket No. 2681, Rhode Island Public Utilities Commission (April 11, 2001) ("*Rhode Island UNE Order*"), 2001 R.I. PUC LEXIS 23 (noting that Verizon's "low fills [that] may be observed in the field . . . do not necessarily represent the most efficient, forward-looking practices, and so are not consistent with TELRIC").

[14] As explained in the Willig Declaration, it is inappropriate to establish utilization rates based

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strong incentives to build excessively large amounts of spare capacity in their networks because doing so allowed the carriers to earn ratepayer-funded returns on spare capacity.[15] Indeed, much of the incumbents' outside plant was installed before the advent of incentive rate regulation. Because it would be nonsensical to remove this spare loop capacity once deployed, the incumbents' embedded fills necessarily reflect their past practices of building excess loop capacity in their networks – fills that are lower than those that would exist in an efficient, forward-looking network.

38. Second, the incumbents' existing networks have been cobbled together and redesigned over the past 100 years to account for populations that have continually expanded, contracted, and moved. As a consequence, the embedded networks contain numerous feeder routes and other plant built to accommodate future growth that did not ultimately materialize – routes that would not exist on a reconstructed network, thereby rendering the incumbents' existing fill an inaccurate estimate of fill in a forward-looking network.

39. Third, large parts of the incumbents' existing patchwork networks have been designed and installed with engineering techniques and technologies that have since become

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upon the incumbent's actual forward-looking plans over the short-run. If, however, a short-term planning horizon is adopted, fill factors would be higher than those that have been established by state commissions. Indeed, in the short-term, the number of switched access lines has been virtually stagnant since 1996. Under such circumstances, it would be counterintuitive for any carrier to deploy substantial amounts of spare capacity in the network when substantial demand is unlikely to increase in the short-run. As a consequence, in the short-run, utilization rates should approach 100 percent.

[15] As the separate declarations of Dr. Willig and Mr. Klick explain, the advent of incentive or price cap regulation has not eliminated the incentives to overbuild the network.

obsolete. Because the incumbents' networks were constructed over decades and do not fully incorporate recent technology that permits networks to operate in ways that reduce the need for spare capacity, embedded fill factors bear no relationship to the utilization rates that could be achieved in an efficient, forward-looking network.

40. For example, in the past few decades, the incumbents have substantially changed the manner in which they engineer and construct outside plant, changing from multi-party lines and multiple-appearance plant to a more efficient and economical Carrier Serving Area ("CSA") design. In this regard, from the early 1960's until approximately 1972, outside plant design guidelines mandated the use of a Feeder Distribution Interface ("FDI"). The FDI provided a manual cross-connection point between feeder and distribution plant. Compared to "multipled plant" (originally designed for party-line service so that a single cable pair would appear for assignment in several locations; *i.e.*, multiple bridged taps), interfaced plant provides greater flexibility in the network.[16]

41. In the early 1970's, the SAC design was introduced as a prescription simplified engineering planning and design method, and was the first major attempt to modernize the network to care for growing and ubiquitous service to an ever shifting customer base. Under

[16] *See* Telcordia, Telcordia Notes on the Networks (Oct. 2000) at 12-3 (noting that "[i]nterfaced plant uses a manual cross-connect and demarcation point, the FDI, between the feeder plant and distribution plant. The cross-connect, or interface, allows any feeder pair to be connected to any distribution pair. This increases flexibility and reduces outside plant deployment and labor costs. Compared to both multiple and dedicated plant, interfaced plant provides greater flexibility in the network and represents the present conventional (metallic pair) distribution plant design philosophy").

SAC design, the distribution cable network is connected to the feeder network at a single interconnection point, with no multipled copper feeder cable facilities (*i.e.*, zero bridged tap).[17]

42. In 1980, the SAC design concept was incorporated in the Carrier Serving Area concept.[18] A CSA is a planning entity consisting of a distinct geographic area that can be served by a single Digital Loop Carrier ("DLC") Remote Terminal ("RT") site. Over the past 20 years, the incumbents have installed FDIs that permit the allocation of limited capacity more effectively to different portions of their networks, thereby minimizing the need to engineer capacity for a particular location or neighborhood. Under the more recent CSA design, capacity that is not being utilized in one distribution area can be allocated to one that is experiencing more growth. As a consequence, the incumbents are able to serve customers with fewer facilities and reduced levels of spare capacity.

43. However, large portions of incumbents' existing networks were constructed before their CSA design standards were implemented, and those portions of the networks still incorporate design technology that is decades old. Thus, a measurement of an incumbent's actual or embedded fill will necessary reflect this older, less efficient technology (including, in some instances, facilities that were installed near the beginning of the 20th century).

44. Fourth, today and going forward, some incumbents deploy or will deploy Next Generation Digital Loop Carrier ("NGDLC") equipment in their outside plant only when they

[17] Bellcore (now know as Telcordia), Telecommunications Transmission Engineering (1990) at 93.

replace copper feeder cables with fiber optics and loop electronics (*i.e.* DLC) or upgrade older DLC systems. NGDLC is designed to employ a digital interface with Central Office switches (GR-303). However, the incumbents continue to maintain within their existing networks older, less efficient DLC equipment such as TR-008 and subscriber line carrier equipment. Newer NGDLC equipment requires fewer transport facilities (between the Central Office and the Remote Terminal) to provision services because it has, *inter alia*, the ability to concentrate the incumbents' facilities. As a result, NGDLC equipment requires far less transport capacity and allows the incumbents to maintain higher levels of utilization than were possible using older equipment. Thus, embedded fill will necessarily reflect the older, less efficient DLC equipment instead of the newer NGDLC equipment that an efficient carrier would deploy in a forward-looking network.

45. Additionally, as described below in my discussion on line counts, because NGDLC equipment can serve three times the line capacity of older DLC equipment, NGDLC has effectively reduced the total number of CSAs and expanded the size of CSAs. Because NGDLC serves substantially more lines than the older DLC systems, larger copper distribution cables can be deployed with NGDLC. As a consequence, distribution fill rates will be higher using NGDLC due to the improved efficiencies associated with deployment of larger distribution cable design.

(footnote continued from previous page)
[18] Telcordia, Telcordia Notes on the Networks (Oct. 2000) at 12-4.

46. Furthermore, the use of fiber-fed NGDLC systems in the feeder route allows feeder plant to have significantly higher levels of utilization than older copper feeder cables because additional service requirements can be addressed by simply installing additional channel units at the Remote Terminal site after the initial system is placed into service. Using NGDLC systems allows relief to be accomplished in a matter of minutes instead of the traditional lengthy timeframes required to reinforce copper feeder facilities. As more DLC technology is deployed in the outside plant network, the incumbents will have even greater opportunities to minimize costs associated with spare capacity. As a consequence, a network with a greater percentage of customers served by DLC would be able to sustain measurably higher levels of fill than a network comprised largely of copper plant. Thus, a snapshot of the incumbent's current embedded fill at a given point in time cannot possibly serve as a reasonable proxy for a forward-looking fill assumption.

47. Fifth, embedded fill levels in the incumbents' networks do not and cannot reflect the utilization rates that would be expected in a forward-looking network as the incumbents transition from all copper to predominately fiber-based plant. The incumbents currently are implementing plans to retire copper facilities and install fiber-to-the curb in the same distribution areas where copper was previously deployed. For example, in October 1999, "SBC announced plans to offer broadband services to approximately 80% of SBC's United States wireline customers over the next three years (Project Pronto)," and that it would "invest an estimated $6

billion in fiber, electronics and other technology for this project" which would "include moving many customers from the existing copper network to a new fiber network."[19]

48. Similarly, Verizon recently announced "plans to roll out fiber-optic connections to every home and business in its 29-state territory over the next 10 to 15 years."[20] Other published reports indicate that BellSouth, SBC and Verizon "could be taking fiber to between two and five million homes a year by 2005" at a cost of "close to half of the planned 2003 capital budgets for the three RBOCs!"[21] In implementing their fiber-to-the-curb plans, the incumbents are placing parallel copper and fiber facilities in their networks; as a result, copper utilization rates will necessarily decrease dramatically as the incumbents move subscribers from copper to fiber facilities.

49. However, the embedded low copper fill rates during this period of transition from a copper-based to a predominately fiber-based plant are clearly inappropriate indicators of the utilization rates expected in a forward-looking network over the long run. Moreover, the elimination of the impact of the low estimated fills in copper cable is critical, particularly when competitors are denied access to the overlaid fiber facilities. Indeed, if the effects of such lower copper fills during this transition period are not eliminated when calculating forward-looking

[19] SBC Communications Inc. 1999 Annual Report at 12.

[20] BusinessWeek Online, "Verizon's Gutsy Bet," August 4, 2003.

[21] Clifford Holliday, "Baby Bells' FTTP: Is it really a plan?" Lightwave Magazine , October 2003 (emphasis in original).

fills, the end result is that competitors will be subsidizing outside plant facilities which are not subject to unbundling and from which, therefore, competitors will derive no benefit.

50. Sixth, embedded fill levels are not only inappropriate as proxies for TELRIC-compliant fill factors, but even if they were, the very manner in which incumbents measure fill yields inaccuracies in their purported "actual" utilization rates. Thus, for example, the incumbents typically propose low copper distribution utilization rates based on their embedded fill as measured at the serving area interface ("SAI"). However, fills measured at the SAI would not even accurately reflect the incumbents' actual fill. The SAI is a point in the network where the feeder plant is connected to the distribution plant – a point in the distribution network which typically has the *largest* number of distribution facilities available. In this regard, engineers design distribution cable starting at the customer location. As the distribution cable proceeds from the customer location toward the SAI, the distribution cable is aggregated with each adjacent cable, thus creating larger and larger cable cross sections until the cable reaches its maximum size at the SAI. Thus, a measurement of fill at the SAI would not accurately reflect the utilization rate of the distribution cables in the network. If anything, the utilization rate for distribution cables measured at the SAI would be much lower than at other parts of the distribution network.[22]

[22] It should also be noted that using the utilization factor or "fill factor" as measured at the SAI as the input in a cost model would produce even lower actual cable utilization rates or achieved fills, because cables are manufactured in discrete sizes and cost models would select the next available cable size – thus overstating the cost of the distribution.

51. Similarly, the incumbents measure their embedded copper feeder fill at the vertical side of the Main Distribution Frame ("MDF") in the Central Office. However, measuring fill at the MDF understates the actual fill of the copper feeder route. Copper feeder cable extends from the Central Office MDF to the Feeder Distribution Interface or the SAI. In general, cable facilities are larger at the Central Office end and taper to a smaller size as they traverse the route to destination FDIs. The cable is typically monitored at the MDF, in the route (cross section fill) and at the feeder side of the interface. Because of concerns regarding the possible exhaustion of conduit capacity that enters a central office, some engineers routinely maximize the size of the feeder cable that enters the central office. In such circumstances, a measurement of copper feeder fill at the MDF would be lower than that in the feeder route further away from the central office. As a consequence, the incumbents' embedded copper feeder fills are not only inappropriate proxies for forward-looking utilization rates, but they are also highly inaccurate and understated.

52. Seventh, as noted above, using embedded fill factors as the benchmark for UNE capacity assumptions is wholly inappropriate because it obfuscates the important difference between appropriate engineering assumptions for capacity design and the appropriate economic assumptions for pricing that capacity. By using embedded fill factors, the incumbents not only make inappropriate engineering assumptions regarding capacity design, but they also fail to properly apportion the costs of spare capacity between present and future ratepayers.

C. Quantifying Efficient Fill

53. The *Notice* inquires about mechanisms for quantifying efficient fill, as well as those factors that state commissions consider in establishing fill rates.[23] State commission decisions reflect widely divergent views regarding the appropriate fill factors in a forward-looking network. State commissions have accepted the incumbents' unreasonably low fill factors, adopted the higher utilization rates proposed by competitors, or somehow arbitrarily split the baby, instead of establishing TELRIC-complaint fill factors. Factors that would be probative in assessing the fill factors for copper distribution, copper feeder, fiber feeder, and RT Common Plug-Ins and Common Electronics are discussed below.

1. Copper Distribution

54. In its *Inputs Order*, the Commission adopted target utilization rates for distribution cable that ranged between 50 to 75 percent.[24] These and higher ranges of distribution fill have been determined to be appropriate in state UNE proceedings.[25] The

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[23] *NPRM* ¶¶ 74-75.

[24] *Inputs Order*, App. A.

[25] *See*, *e.g., Kansas/Oklahoma § 271 Order* ¶ 80 (noting that the Kansas Commission adopted a 53 percent fill factor for distribution cable); *id.* (referring to the 50 percent fill factor for distribution cable adopted by the New York Public Service Commission); Order No. 12610, *In the Matter of the Implementation of the District of Columbia Telecommunications Competition Act of 1996 and Implementation of the Telecommunications Act of 1996*, Formal Case No. 962, District of Columbia Public Service Commission (December 6, 2002) ("*DC UNE Order*") 2002 D.C. PUC LEXIS 421 (adopting a distribution fill factor of 60 percent); *Virginia Arbitration Order* ¶ 250 (adopting target copper feeder distribution fills ranging from 50 to 75 percent); *Rhode Island UNE Order,* 2001 R.I. PUC LEXIS 23 (approving distribution fill factors ranging from 50 to 60 percent); Phase II Order, *Investigation into New England Telephone and Telegraph Company's (NET's) tariff filing re: Open Network Architecture, including the unbundling of NET's network, expanded interconnection, and intelligent networks in re: Phase*

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incumbents typically have proposed distribution fill rates as low as 30 or 40 percent, contending that engineering standards mandate at least two or more distribution pairs per household. These arguments are demonstrably unsound.

55. This Commission has found that a fill factor of 30 percent for distribution cable violated TELRIC:

> The ALJ used a loop fill factor of 30 percent, and rejected the 50 percent figure proposed by AT&T. Under TELRIC, we determine what the LRIC would be for an efficient provider. We find that a fill factor that assumes that more than two-thirds of capacity is idle for an indefinite time is unreasonably low. . . . The ALJ's decision violates TELRIC because it used current fill, and refused to consider the forward-looking fill or assume that the fill factor would increase over time.[26]

(footnote continued from previous page)
II, Module 2 – Cost Studies, Vermont Public Service Board, Docket 5713 (February 4, 2000) at 20-21 (adopting a 50 percent fill for copper distribution); Ruling on Applications for Rehearing, Reargument, or Reconsideration, Decision No. C02-409, *In the Matter of US West Communications, Inc.'s Statement of Generally Available Terms and Conditions,* Docket No. 99A-577T, Colorado Public Utilities Commission (April 17, 2002), 2002 Colo. PUC LEXIS 315, *43 (adopting distribution fill factors ranging from 50 to 75 percent resulting in a weighted distribution fill of 70.49 percent); Order, *Investigation of Total Element Long-Run Incremental Cost (TELRIC) Studies and Pricing of Unbundled Network Elements*, Docket No. 97-505, Maine Public Utilities Commission (February 12, 2002), 2002 Me. PUC LEXIS 49 (adopting a 50 percent fill for distribution cable); *Indiana UNE Order*, 1998 Ind. PUC LEXIS 482, *30 (adopting a fill rate of 80 percent for distribution); *Maryland UNE Order* at 52 (adopting a distribution fill factor of 62 percent); Opinion, *In Re: Petition of BellSouth Telecommunications, Inc. to Convene A Contested Case to Establish "Permanent Prices" for Interconnection and Unbundled Network Elements*, Docket No. 97-01262, Tenn. Regulatory Utility Commission (February 23, 2001) (adopting a 50.2 percent distribution fill); *New Jersey UNE Order* at 84 (adopting a 53 percent distribution fill).

[26] *Kansas/Oklahoma § 271 Order* ¶ 80 (footnotes omitted).

56. Similarly, in its decision regarding Verizon's application for Section 271 authority in Massachusetts, the Commission also indicated that the 40 percent fill factor used by Verizon for copper distribution cable was, in all likelihood, contrary to TELRIC as well, stating:

> In the *SWBT Kansas/Oklahoma Order*, the Commission found that a fill factor of 30 percent for distribution cable was too low because it assumed that too large a percentage of capacity would be idle for an indefinite time, contrary to TELRIC's presumption of an efficient network. The Commission noted that it adopted fill factors ranging from 50 to 75 percent for the USF cost model, that the Kansas Commission adopted a 53 percent distribution cable fill factor, and that the New York Commission adopted a 50 percent distribution cable fill factor. We question whether the low fill factor used in Massachusetts is appropriate without state-specific justification.[27]

57. Furthermore, the notion that standard engineering practices require two or more pairs per household is belied by: (1) the general industry standard planning guideline for distribution cable, which is in the range of 1.5 to 2.0 pairs per household; and (2) the incumbents' own engineering practices, which encourage the minimization of spare capacity wherever feasible and call for the installation of fewer than two distribution pairs per household.[28] Leaving these deficiencies aside, the engineering guidelines are suggested

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[27] Memorandum Opinion and Order, *In the Matter of Application of Verizon New England Inc., Bell Atlantic Communications, Inc. (d/b/a Verizon Long Distance), NYNEX Long Distance Company (d/b/a Verizon Enterprise Solutions) And Verizon Global Networks Inc., For Authorization to Provide In-Region, InterLATA Services in Massachusetts*, CC Docket No. 01-9 (April 16, 2001) ("*Massachusetts § 271 Order*") ¶ 39 (footnotes omitted).

[28] *See, e.g., In the Matter of Proceeding to Determine Permanent Pricing for Unbundled Network Elements*, Docket No. P-100, Sub 133d, North Carolina Utilities Commission, Hearing Tr. 360-61, November 20, 2002 (Caldwell) (BellSouth) (conceding that BellSouth's cost model builds two pairs to every household, but that BellSouth's practices allow for the installation of fewer pairs).

parameters only, and engineers have the flexibility to exercise their own sound judgment in determining the appropriate size of outside plant.

58. Moreover, the absurdity of the incumbents' assertions that two or more distribution pairs per household would be required in the forward-looking network is further demonstrated by: (1) the number of switched access lines, which has essentially been stagnant since 1996; and (2) the affordability, availability and popularity of wireless, DSL, and cable modem services which allow customers to meet both voice and data requirements with a single cable pair.[29] Relatedly, the Commission's recent rulings requiring number portability in wireless and the obligation of wireless carriers to implement technology that will permit them to identify the location of subscribers making a wireless 911 call will likely spawn substantial migrations of customers from wireline to wireless service.[30] Given these circumstances, no rational carrier in the forward-looking network would reasonably install the excessive amounts of unusable capacity represented by the absurdly low distribution fill factors that the incumbents have proposed in state proceedings.

[29] *See, e.g., New Jersey UNE Order* at 84 (rejecting Verizon's proposed 40 percent distribution fill factor and noting that "past engineering guidelines will be positively impacted" by line-splitting and line-sharing and that such innovations should lead to "an overall reduction in lines used for the express purpose of connecting to the Internet").

[30] These factors are discussed in greater detail below in my discussion of the issue of the need for line count data.

59. The following illustrates how fill factors and growth rates interact over the plant life of the outside plant network where it is assumed that the plant cable has a life of approximately 20 years.

Facilities Required = $(1 + \text{Add'l line demand})^{(\text{PLANT LIFE})}$.

Initial Fill Factor ("IFF") = 1 ÷ Facilities Required.

At 1% growth: IFF = $1 \div (1.01)^{20}$ = 82.0% Initial Utilization

At 2% growth: IFF = $1 \div (1.02)^{20}$ = 67.3% Initial Utilization

At 3% growth: IFF = $1 \div (1.03)^{20}$ = 55.4% Initial Utilization

60. Assuming a distribution fill factor of 40 percent and an average growth rate of three percent per year, distribution spare capacity would not be exhausted for over 25 years – a period that is much longer than the expected life of the copper distribution facilities. The absurdity of such an approach is self-evident.

2. Copper Feeder

61. In its *Inputs Order*, the Commission adopted copper feeder target utilization rates ranging from 70 to 82.5 percent. These ranges of copper feeder fill have been approved in a number of state proceedings;[31] and even higher copper feeder fill factors are reasonable to assume in a forward-looking network for two reasons.

[31] *Rhode Island UNE Order*, 2001 R.I. PUC LEXIS 23 (approving copper feeder fill factors
(footnote continued on next page)

62. First, because actual POTS wireline growth is stagnant, it would be nonsensical for any rational carrier to install substantial amounts of excess copper in its outside plant to meet demand that may never materialize. An efficient carrier in such circumstances presumably would maximize utilization of its copper feeder to the greatest extent possible. Thus, it stands to reason that utilization rates for copper feeder should be quite high in a forward-looking network.

63. Furthermore, the manner in which copper feeder is reinforced provides further confirmation that copper feeder fill factors in a forward-looking environment would be high. The relief triggers for feeder – the point at which the engineer begins considering providing relief for the feeder route – can range from 85 to over 90 percent.[32] It must be emphasized, however, that outside plant is not automatically replenished when existing inventories reach or exceed the threshold relief trigger. Relief is simply a trigger for the outside plant engineer to study the feeder route to determine whether relief is appropriate. In fact, engineering guidelines in general provide that relief can be implemented when feeder utilization approaches 100 percent. For these reasons, an assumption that copper feeder fills should be at the higher end of the spectrum is eminently reasonable.

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ranging from 75 to 80 percent); *Indiana UNE Order*, 1998 Ind. PUC LEXIS 482, *30 (approving an 80 percent copper feeder fill); *DC UNE Order* (adopting a fill factor of 80 percent for copper feeder cable); *New Jersey UNE Order* at 85 (adopting a 75 percent fill factor for copper feeder).

[32] *See, e.g.,* BellSouth's Response to Staff's Third Set of Data Requests to BellSouth, Item No. STF-3-11, Georgia Public Service Commission, Docket No. 7061-U (referring to 85-90 percent fill at relief for copper feeder cable).

3. Fiber Feeder

64. In the *Inputs Order*, a fill factor of 100 percent for fiber feeder has been adopted.[33] Given the inherent physical nature of fiber feeder, a fill factor of 100 percent is reasonable. In this regard, fiber optic multiplexers commonly operate on one "send" fiber and one "receive" fiber. In 100 percent redundancy configurations, for each working transmit and receive fiber, a "protect" or redundant transmit fiber and receive fiber are installed. Because fiber inherently contains spare capacity, capacity can be enhanced by simply upgrading the electronics at either end.[34]

65. In general, the incumbents have argued that fiber feeder utilization should be significantly below 100 percent because the 12-fiber ribbon structure requires the provisioning of excess strands. However, in a forward-looking network, "excess" fibers from use of 12-fiber ribbons will be used to provide other services, resulting in little, if any, spare fiber. For example, a carrier would use excess fiber to provide high-speed business services. Typically, business demands for high speed services are satisfied by extending spare fibers from a Remote Terminal location into the building location. For other high speed business services, multiplexers are installed at the Central Office and Remote Terminal location on spare available fibers, and a sub-set of the capacity is extended into a business location from the Remote Terminal. Spare fibers at a Remote Terminal frequently are used to upgrade the site. Similarly, larger installations (*e.g.*

[33] *Inputs Order* ¶ 208.
[34] *Id.*

Controlled Environmental Vaults, or CEVs) that contain older stand-alone multiplexer-driven DLC are augmented or upgraded to newer NGDLC. Spare fibers are terminated at the site on the newly installed NGDLC equipment. Because the technology is rapidly evolving, fibers will be completely utilized for a variety of transmission services, and the key to these advanced systems lies in using the existing fibers. The methods for expanding the capacity of in-place fiber feeder cable continue to be developed. One of the latest examples involves the use of Dense Wave Division Multiplexing ("DWDM"), which expands fiber capacity by using different colored lasers over a single fiber. As a consequence, the appropriate utilization rate for fiber cable on a forward-looking basis should be 100 percent.

4. RT Plug-Ins and RT Common Electronics Fill Factors

66. State commissions have approved fill factors for RT Plug-Ins and RT Common Electronics ranging from 70 to 90 percent.[35] In a forward-looking network, the fill rates for RT Plug-Ins and RT Common Electronics should be quite high. In this regard, Digital Loop Carrier ("DLC") systems are deployed to transport calls from the Central Office to Remote Terminal equipment cabinets located in the vicinity of the customers served. A plug-in card is installed in the Remote Terminal equipment. The analog signal from the customer's cable pair is converted to a digital signal at the interconnection of the cable pair to the DLC electronics, and the

[35] *See Virginia Arbitration Order* ¶ 265 (approving fill factors ranging from 70 to 82.5 percent for RT Plug-Ins and RT Common Electronics), *D.C. UNE Order*, Table 3 (approving a fill factor of 90 percent for RT Plug-Ins and 80 percent for RT Common Electronics); Order on Unbundled Network Element Rates*, Proceeding on Motion of the Commission to Examine New York Telephone Company's Rates for Unbundled Network Elements,* New York Public Service Commission, Case 98-C-1357 (January 28, 2002) at 102 (adopting an RT electronics fill factor of 88 percent).

conversion takes place at the plug-in channel unit. Plug-in channel units used with DLC are easy to install, requiring only a field visit, and the installation costs are very small relative to the cost of the plug-ins. Furthermore, these lightweight, easily transportable and reuseable plug-ins are installed on a regular basis to handle six months' worth of growth.[36] Given the high carrying cost of excess electronic capacity and the relative ease of upgrading the capacity of such electronic equipment, the fill factor for loop electronics should be high.

D. Other Issues Regarding Fill Factors

67. The *Notice* asks whether "carrier of last resort obligations" are relevant in assessing appropriate fill factors in a forward-looking network.[37] The answer is no. In proposing low fill factors, the incumbents invariably argue that because they serve as the carrier of last resort, they must maintain substantial excess capacity so that they are prepared to provide facilities even if the expected demand never materializes. However, this argument is a red herring. The Universal Service Fund compensates telecommunications companies that provide services to, *inter alia*, low income communities and rural areas where the cost of providing services is high. More fundamentally, the incumbents' arguments are nothing more than a variant of their claim that fill factors should be based on ultimate demand – an argument that this Commission has soundly rejected.[38]

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[36] *See Maryland UNE Order* at 53 (noting that "plug-ins are readily available and easy to install, which provides the opportunity to wait a longer period of time before installation when capacity is close to being exhausted").

[37] *NPRM* ¶ 74.

[38] *Id.* ¶ 73.

68. The *Notice* also asks whether the utilization rates at which competitors operate are relevant in setting forward looking fill factors. Once again the answer is no. The stark differences in the networks, customer bases, and business plans of incumbents and competitors demonstrate that their comparative utilization rates are of no probative value in establishing forward-looking fill factors.

69. In finding that requesting carriers are impaired without access to stand-alone, mass market copper loops, the Commission observed that the incumbents' costs of local loops serving the mass market are largely sunk, and that competitors do not have the large customer base that the incumbents enjoy – a base which provides a highly predictable source of funding to offset substantial local loop deployment costs.[39] Given these critical differences between incumbents and competitors, the fill rates at which competitors operate are wholly irrelevant in establishing forward-looking factors. Moreover, even assuming *arguendo* that a competitor somehow matched the incumbents in terms of economies of scale and scope, the competitor's actual embedded fill levels would be irrelevant in determining forward-looking fill rates because they too would reflect the inefficiencies in the embedded network.

70. The *Notice* asks whether there is any evidence that utilization rates would change with increased competition and whether carriers in competitive markets would likely reduce prices in order to increase utilization rates. Arguably, in a competitive environment, efficient competitors would not saddle themselves with excess, non-revenue producing spare capacity and would maximize utilization of their facilities to the greatest possible extent.

71. It is well established that some of the important potential benefits of competition include increased efficiency and reduced prices. And certain trends in other industries suggest that competition does, in fact, result in increased utilization. For example, in a report on the impact of deregulation in the electric industry, Dr. Willig observed that "it is indisputable that, except for markets with natural monopoly features, competition will foster efficiency and stimulate innovation in the production, provisioning, packaging, and pricing of goods and services," and that such benefits have been attained in various industries, including the transportation industry.[40]

72. For example, it has been reported that, in 1977 – the year before the enactment of airline deregulation legislation – the capacity utilization or "load factor" for domestic airlines was 57 percent.[41] In contrast, by 1996, the load factor for the airline industry reportedly reached "nearly 70 percent."[42] Similarly, it has been reported that "[t]trucking firms have achieved higher load factors" due, in part, to deregulation in that industry.[43]

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[39] *Triennial Review Order* ¶¶ 236 – 238.

[40] Robert D. Willig, *Effective Deregulation of Residential Electric Service: $21 Billion in Annual Savings for Consumers and a $91 Billion Boost to the Nation's Economy* at 5.

[41] Air Transport Association, U.S. Airline Cost Index, Major and National Passenger Carriers, Second Quarter 2003.

[42] Steven A. Morrison, Clifford Winston, "Regulatory Reform of U.S. Intercity Transportation," Essays in Transportation Economics and Policy: A Handbook in Honor of John R. Meyer, Brookings Institution Press (1999) at 481.

[43] *Id.*

73. Other evidence suggests that increased utilization resulting from competition spawns price reductions. For example, at least one incumbent, GTE, "admitted at hearing that competitive entry will likely induce price reductions."[44] Published reports and studies examining other industries reveal that prices decline with increased competition. For example, it has been reported that, as a result of deregulation of the electricity market in Pennsylvania, "[c]onsumers have already saved more than $3 billion in Pennsylvania by paying prices for electric power that are 4.5% below the national average."[45] Additionally, the United States General Accounting Office has reported that "[t]he average fare per passenger mile, adjusted for inflation, has fallen since deregulation about as much at airports serving small and medium-sized communities as it has at airports serving large communities."[46] Yet another study has concluded that "[a]irlines' real average fares have declined about a third since 1976, just before the CAB initiated significant regulatory reform," and that deregulation "is responsible for roughly 60 percent of the decline in fares since 1976, which implies that fares are 20 percent lower than they would have been had the industry still been regulated."[47]

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[44] *Indiana UNE Order*, 1998 Ind. PUC LEXIS 482, *25.

[45] Phillip G. Harris, *Where Electricity Deregulation Works*, Wall St. J., May 16, 2001 at A-22.

[46] United States General Accounting Office, Report to the Chairman, Committee on Commerce, Science, and Transportation, U.S. Senate, Airline Deregulation Changes in Airfares, Service, and Safety at Small, Medium-Sized, and Large Communities, April 1996 at 3.

[47] Steven A. Morrison, Clifford Winston, "Regulatory Reform of U.S. Intercity Transportation," Essays in Transportation Economics and Policy: A Handbook in Honor of John R. Meyer, Brookings Institution Press (1999) at 484 (footnote omitted).

74. These industry trends suggest that increased competition can result in increased efficiencies, higher utilization rates, and reduced prices. Of course, the extent to which these substantial benefits will attain from increased facilities-based competition will depend on any number of factors, including vigorous enforcement of the 1996 Act.

E. Documents

75. Certain documents and data should be produced by incumbents during UNE rate proceedings to assist the parties and regulators in determining the appropriate utilization rates. In this regard, the incumbents' engineering guidelines are highly probative in assessing their claims regarding the engineering standards which purportedly undergird their fill factors analysis. The incumbents should also be required to produce documents relating to the feeder and distribution relief jobs they have undertaken in their networks. In a number of proceedings, however, incumbents have objected to requests for information relating to their relief jobs.[48] However, such data are highly relevant in assessing: (1) whether the incumbent's relief jobs were designed to replace exhausted outside plant facilities or to replace facilities that have deteriorated over time and were generating high service trouble rates – defective facilities that presumably would not exist in an efficient network; and (2) the incumbents' claims regarding the inherent impossibility of operating at the higher fill factors advocated by competitors. Given the importance of these documents, the Commission should expressly hold that an incumbent must produce these documents to the State UNE commission and to the CLECs once a UNE rate

[48] *See, e.g.,* Verizon Response to AT&T/WorldCom #1-47, *Virginia Arbitration Proceeding.*

proceeding is instituted. Furthermore, to the extent that the incumbent claims that part or all of these documents are proprietary, the State commission should provide in a protective order that the parties may use these documents in other State proceedings as long as they otherwise abide by the confidentiality requirements of the protective order.

III. STRUCTURE SHARING

76. The term "'[s]tructure sharing' refers to how much of the cost of installing poles, digging trenches, and placing conduit would be shared on a forward-looking basis by the incumbent with other entities, such as power companies, cable operators, or other telecommunications carriers."[49] The higher the level of structure sharing among entities, the lower the cost of the common structure that will be borne by the incumbent.

77. In its *Notice*, the Commission asks a series of questions about structure sharing opportunities in a forward-looking network, including: what guidance it should give to state commissions in determining structure sharing percentages; whether incumbents' actual embedded sharing percentages or sharing opportunities that existed at the time the outside plant was built should serve as the basis for setting forward-looking structure sharing percentages; and the sources of data that are relevant in determining structure sharing percentages.[50]

[49] *NPRM* ¶ 71.

[50] *Id.* ¶ 72.

78. The Commission has recognized that there are myriad sharing opportunities that lower the incumbent's costs of structure.[51] Indeed, in its *Inputs Order*, the Commission approved significant levels of structure sharing when computing carriers' eligibility and assessments under its universal services mechanism.[52] Similarly, some state commissions have adopted structure sharing percentages which mirror some or all of the structure sharing percentages adopted in the *Inputs Order*.[53]

79. In a forward-looking environment, an efficient carrier would have strong economic and legal incentives to share their outside plant structure for several reasons. First, because a telecommunications company can substantially reduce its costs by sharing structure, in a forward-looking environment an efficient carrier would fully take advantage of structure sharing opportunities. Second, recent design changes in outside plant structure, including the recent migration to a fiber-based design in the cable industry, have increased opportunities for structure sharing arrangements. Third, electric utilities, cable companies, and other carriers have similar incentives to minimize costs and increase their own structure sharing in the long-run. Fourth, the Telecommunications Act of 1996 provides additional incentives for structure sharing

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[51] *See Inputs Order* ¶ 243.

[52] *Id.* (adopting for "aerial structure . . . 50 percent of structure cost in density zones 1-6 and 35 percent of the costs in density zones 7-9 to the telephone company" and for "underground and buried structure . . . 100 percent of the cost in density zones 1-2, 85 percent of the cost in density zone 3, 65 percent of the cost in density zones 4-6, and 55 percent of the cost in density zones 7-9 to the telephone company").

[53] *Arizona UNE Order*, Ariz. 2002 PUC LEXIS, 11, * 24 (adopting 50 percent sharing percentages for aerial, underground and buried cable); *DC UNE Order*, 2002 D.C. PUC LEXIS 421, *216 (rejecting Verizon's proposed structure sharing percentages and finding that the "sharing adjustments recognized by the FCC should be used in the TELRIC Study for the UNE

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because it requires utilities to provide nondiscriminatory access to poles, ducts, conduits and rights-of-way.[54] Fifth, as explained in more detail below, states, municipalities, and towns across the country have adopted ordinances and regulations that either require or strongly encourage utilities, carriers, and cable television companies to coordinate their excavation activities and share their facilities.

80. Thus, in a forward-looking network, an efficient carrier would fully take advantage of the opportunity to share the costs of structure with other utilities and companies. The degree to which structure sharing will occur will depend upon, *inter alia*, the type of structure and density zone. As discussed in more detail below, the incumbents' embedded structure sharing percentages do not and cannot reflect the structure sharing opportunities that would be available in a forward-looking environment.

A. Embedded Structure Sharing Percentages

81. In determining appropriate structure sharing percentages, it would be inappropriate for state commissions to use the incumbents' actual embedded sharing percentages or rely on the structure sharing opportunities that presumably existed at the time the incumbent's

(footnote continued from previous page)
prices").

[54] 47 U.S.C. § 224(e). *Cf.* Modified Final Order, Nevada Public Utilities Commission, Docket 98-6005 (July 6, 1999) ¶ 20 (noting that, in light of the mandate of the Telecommunications Act, which requires nondiscriminatory access to poles, ducts, conduit, and rights-of-way, Sprint's assumptions of no sharing of underground ducts and conduits are unreasonable). The Act requires attachers to pay for two-thirds of the non-usable space on poles, ducts, conduits and rights-of-way. This two-thirds requirement suggests that Congress believed that at least three parties would use the incumbent's outside plant structures, and thus provides for compensation on that basis.

loop plant was built.[55] In this regard, in the past, the incumbents and other regulated monopolists had little incentive to identify or take advantage of available opportunities for structure sharing since such sharing would have reduced the underlying ratebase upon which their rates of return were computed. Thus, the degree of sharing in the incumbents' embedded networks merely reflects the sharing decisions they made when faced with the incentives of a rate-base regulated utility in a monopoly environment. Accordingly, the incumbents' actual embedded sharing percentages will substantially understate the amount of sharing that will exist in a forward-looking market and provide no sound basis from which to estimate the opportunity for structure sharing resulting from the ingenuity of service providers operating in a competitive, forward-looking environment.[56]

82. Likewise, the "structure sharing opportunities that were available at the time the plant was built" cannot legitimately be used as the basis for determining structure sharing percentages. As a practical matter, because the incumbents' embedded networks have been patched together on a piecemeal basis over a number of decades, it would be virtually impossible to determine the date of deployment of each component of outside plant. Putting this practical difficulty aside, much of the outside plant in the incumbents' networks is decades old and was

[55] *Cf.* Further Notice of Proposed Rulemaking*, In the Matter of Federal-State Joint Board on Universal Service; Forward-Looking Mechanics for High-Cost Support for Non-Rural LECs*, CC Docket Nos. 96-45, 97-160 (released May 28, 1999) ¶ 20 (the cost model should "reflect forward-looking technology or design choices").

[56] *See Inputs Order* ¶ 247 ("the forward-looking practice of a carrier does not necessarily equate to the historical practice of the carrier").

installed at a time when there were no other competitors with which to share placement costs.[57] Furthermore, as explained in the Willig Declaration, if UNE prices are based upon the level of sharing that existed at the time outside plant was constructed, the incumbents would have absolutely no incentive to take advantage of structure sharing opportunities in the future. Moreover, if the incumbents do take advantage of structure sharing opportunities in the future, they necessarily would enjoy cost advantages over their competitors that would pay UNE rates based on historic structure sharing opportunities.

83. If structure sharing percentages are based on the sharing opportunities that existed at the time the outside plant was built, those percentages would not properly reflect the level of sharing that would be expected in a forward-looking network as a result of design changes in outside plant. For example, originally, the cable industry relied upon coaxial cable. Because coaxial cable placed in a buried or underground environment is more susceptible to water infiltration and related outages than when placed in aerial structure, the cable industry essentially was restricted to aerial pole structures with minimal opportunities for sharing trenches and conduit. However, the cable industry has recently migrated to a fiber-based design which is receptive to placement in buried and underground environments and adaptable for all structure sharing applications.

[57] *See, e.g.,* Verizon VA Initial Post-Hearing Brief at 73, *Virginia Arbitration Proceeding* (noting that "the cable on Verizon VA's network . . . can be over 30 years old").

84. Similarly, because of conductor loss and insulation issues, the power companies used to be restricted to aerial plant, and their routes tended to be direct lines which did not always meet the service requirements for all potential "sharing" utilities. However, as a result of improvements in sheathing, cable materials, and closures, electrical cables can now be buried for greater distances in joint trenches without power loss. As a consequence, sharing percentages that reflect only the sharing opportunities extant at the time of plant construction would fail to capture these sharing opportunities that are now available as a result of design changes.

85. Additionally, as explained in more detail below, in recent years, states, cities, and towns adopted or proposed codes, ordinances, and regulations that strongly encourage or require structure sharing arrangements. Accordingly, because much of the outside plant in the incumbents' network was installed well before the adoption of such measures, "sharing opportunities that were available at the time the plant was built"[58] cannot legitimately serve as surrogates for forward-looking structure sharing percentages.

86. Several types of sharing opportunities would be available in the forward-looking network, including the sharing of cable supporting structures (such as poles, trenches, and conduits) between the incumbent and other entities, such as power companies and cable television companies. These structure sharing opportunities are discussed in more detail below.

[58] *NPRM* ¶ 72.

B. Structure Sharing With Other Users

1. Aerial

87. In a forward looking network, an efficient new entrant will have substantial economic and legal incentives to engage in structure sharing to a greater extent than an incumbent, or any other monopolist, would today. An efficient carrier would take full advantage of the opportunity to decrease its costs by engaging in structure sharing. On a going-forward basis, the number of parties seeking to participate in such pole sharing arrangements should increase, giving the incumbent additional incentives to decrease its costs substantially.

88. Aside from these economic incentives, the sheer number of municipal ordinances and regulations that have been adopted across the country which substantially limit the number of aerial facilities that can be installed in public rights-of-way provide additional incentives for utilities and carriers to share pole space to the greatest extent possible.[59] Attachment B provides illustrative examples of ordinances and regulations that have been implemented regarding structure sharing.

[59] *See, e.g.,* Paducah, Kentucky, County Code of Ordinances § 108-34 ("Licensees shall utilize existing poles . . . whenever possible"); Broward County, Florida, Ordinance § 20-521 ("[t]he Operator shall enter into agreements for the joint or common use of poles or other wire holding structures where poles or other wire holding structures already exist for the use in serving the County or serving the public convenience"); Vienna, Virginia Town Code § 24-29(a) ("[A] grantee shall utilize existing poles … whenever possible") ; Ordinance No. 2143; Milwaukee, Wisconsin Code of Ordinances, Cable Systems Chapter 99-8-5-(e) ("[e]ach cable system operator shall utilize existing poles, conduits and other facilities whenever possible and shall not construct or install any new, different or additional poles, conduits, or other facilities until the written approval of the public works commissioner is obtained").

89. Although the incumbents and competitors typically agree that pole structures provide opportunities for structure sharing, the parties diverge regarding the structure sharing percentages that would prevail in a forward-looking network. In a forward-looking network it is reasonable to assume that the telephone poles used by the incumbent would be shared with a power company, telecommunications companies, and CATV providers. Today, the sharing of aerial structure is quite common as a result of monthly lease, joint ownership, or shared use arrangements under which the company and the incumbent share responsibility for the poles.[60] In this regard, pole structure is normally divided between high voltage users (electric companies) and low voltage users (telephone and other communications companies). Approximately half of the usable space on a 40-foot pole is used by power companies (which need significant space for intercable separation), and the rest is used by low voltage users, including telecommunications carriers and CATV providers. Thus, when three parties (the power company, the incumbent LEC, and the CATV provider) share this structure, the power company uses 50 percent of the available capacity, and the incumbent and the CATV provider use a maximum of 25 percent each. On a going-forward basis and as CATV penetration increases, there should be increased opportunities for the incumbents to share pole structures with other users.

2. Buried

90. Traditionally, the incumbents have argued that virtually no opportunities for sharing of buried structure would be available in a forward-looking network because the

[60] *Cf.* Ex. VNJ-7 (Gansert Rebuttal) at 29-30, *New Jersey UNE Proceeding* (acknowledging that "the majority of the telephone poles used by [Verizon-New Jersey] are shared with the electric company").

networks of other utilities and carriers are already in place, and therefore, no additional installations of facilities are necessary. In embellishing their arguments, the incumbents also contend that the timing and need for coordination of excavations would preclude any opportunities for buried structure sharing arrangements. The incumbents are wrong on both counts.

91. New developments present substantial opportunities for sharing of buried structure. In new residential developments, developers typically provide the buried trench and place the structure within which the facilities of telecommunications carriers, cable television companies, and utility companies are placed free of charge.[61] As a consequence, the incumbent can avoid buried trenching costs altogether in new developments.

92. Buried structure sharing opportunities in a forward-looking network will not be confined to new developments. Power companies will continue to rebuild and/or replace facilities to accommodate growth in demand and upgrade obsolete facilities. In many areas, rear yard plant construction has been migrated to property roadway during upgrade programs. Furthermore, CATV companies are upgrading their networks to two-way, interactive design

[61] *See, e.g.*, Section 4.4B.2 of Qwest Exchange and Network Services Tariff (Arizona), issued July 30, 2001 (stating that "[t]he Developer/Builder "will provide trench and backfill for the facilities and be responsible for those costs"; *Arizona UNE Proceeding*, Hearing Tr. 913-914 (Torrence) (Qwest) (noting that it is a common practice for developers to provide the trench free of charge); Decision No. 64922, *Arizona UNE Proceeding*, 2002 Ariz. PUC LEXIS 11, *24 (noting that "[w]hen facilities are initially placed in a high growth market there will be a significant amount of developer-provided trench and thus, in a forward-looking model, costs should be reduced by substantial sharing"); Brentwood, California Planning Commission, Resolution No. 01-90, Para. 8, December 18, 2001 (noting that the developer "shall provide joint trenching for telephone, gas, electric, cable TV, and fiber optic service").

systems, and other data service providers are upgrading their networks to fiber. These upgrades provide "an opportunity for carriers to share structure."[62]

93. Additionally, for safety and aesthetic reasons, regulatory bodies are placing increasing pressure on utilities and carriers to locate their structures out of sight. In that connection, any number of municipalities require all utilities or carriers to bury (or underground) facilities or to do so whenever another utility or carrier undergrounds its facilities.[63]

94. Moreover, the incumbents' arguments that the need for coordination precludes structure sharing are flawed in other important respects. The Commission has already rejected the notion that the need for coordination among users in a forward-looking environment would render it impossible for an incumbent to participate in structure sharing.[64] Other evidence refutes any notion that buried structure sharing is both rare and impossible to coordinate.

95. Perhaps one of the starkest illustrations of the absurdity of the incumbents' claims is the fact that they are members of utility coordinating committees which are designed to, *inter alia*, improve the coordination of joint trenching and other structure sharing arrangements. For

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[62] *Inputs Order* ¶ 244 n. 504.

[63] Alaska Statutes § 42.05.381 ("[w]hen an electric utility or a telephone utility is implementing a program to place existing overhead utility distributions lines located in a municipality underground, any other overhead line or cable in the same location should be placed underground at the same time"); Collierville, Tennessee, Code of Ordinances § 117.060(D) ("[w]henever any new or existing electric utilities, cable system or telecommunications facilities are located or relocated underground within a street of the Town, a franchisee that currently occupies the same street shall relocate its facilities underground within a reasonable period of time").

[64] *See Inputs Order* ¶ 244 n. 504.

example, according to the website of the National Joint Utility Notification System ("NJUNS"), BellSouth, Bell Atlantic-New York, Inc., Verizon Pennsylvania, Southwestern Bell, and Verizon Richmond, VA are members of the Board of Directors of NJUNS which "is a national organization of member utilities formed for the purpose of improving the coordination of joint ventures" and "offers utility companies a method of obtaining up-to-date information on a variety of shared concerns, including Pole Transfers, Joint Trenching & Permits for New Attachments to Poles."[65]

96. Furthermore, regulatory pressures have forced and will continue to compel carriers to participate in structure sharing arrangements. In the past few decades, states, cities, and towns across the country have experienced a substantial increase in the number of companies that propose to install buried and underground facilities.[66] As a result of the proliferation of excavations in streets and public rights-of-way, regulatory bodies have commissioned studies or otherwise analyzed the impacts of these construction activities. These

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[65] *See* http://www.njuns.com/njuns_home/index.htm. *See also* Lane County, Oregon Utility Coordinating Council ("LUCC") Member List posted at http://www.luccdig.org/members.cfm (noting that the members of the LUCC include Qwest), and LUCC October 2, 2003 Monthly Minutes (noting that a representative from the Lane County government "encouraged all utilities to use joint trench on the LTD project in Springfield"); Alabama One Call, Summer 2002 Newsletter and Member List (noting that BellSouth is a member of Alabama One Call and that, during monthly meetings of utility coordinating committees, the participants discuss, *inter alia*, joint trenching projects).

[66] *See, e.g.,* San Bernardino, California Rights-of-Way Users Questionnaire (noting that "[t]here has been a significant increase in the number of applicants to install underground telecommunication and cable television facilities in the County," and that "[t]he substantial increase in construction activity has caused and has the potential to cause a material and adverse impact on: street surface life, pedestrian and vehicle traffic flow, quality of life in residential areas, and the conduct of commerce in general by retail businesses in the County").

studies have concluded that multiple excavations result in the degradation of pavement life, disruptions in traffic flows, safety problems, and increased costs to communities.[67] In response to such concerns, states, cities, and towns have implemented a wide variety of ordinances, regulations, policies, and measures that are designed to minimize damage to streets, reduce street closures, and enhance coordination of excavation activities.[68] Attachment B provides illustrative examples of structure sharing requirements across the country.

97. For example, to minimize street closings and degradation of streets attributable to multiple excavations, states, cities and towns have implemented codes, regulations, and ordinances which require or strongly encourage joint trenching.[69] Indeed, such joint trenching

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[67] A Resolution of the City Council of the City of Santa Ana Setting the Amount of the Trench Cut Fee Established Pursuant to Article III of Chapter 33 of the Santa Ana Municipal Code and Adding Said Fee to the Miscellaneous Fee Schedule, Section 1(A) (noting that "[s]tudies performed on streets in the cities of Austin, Kansas City, Burlington, Cincinnati, Los Angeles, Sacramento, Phoenix and San Francisco, all have concluded that excavations in paved streets degrade and shorten the life and the surface of the streets"); City of Frisco, Texas, Right-of-Way Management Ordinance No. 02-05-65 (May 7, 2002) (noting that street excavation "may significantly degrade and shorten the life of the surface of the Streets" and "may significantly interfere with public use of the Streets"); Nichols-Vallerga & Associates, City of Seattle: Impact of Utility Cuts on Performance of Seattle Streets, Submitted to City of Seattle, Seattle Transportation (January 31, 2000) ("Seattle Utility Cut Report") at 2 (noting that "[i]nterest in the impact of utility cuts on roadway performance has increased in the last ten years," and that "[t]he results of studies conducted by public agencies show that the presence of utility cuts lower measured pavement condition scores (indexes) compared to pavements of the same age with no utility cuts").

[68] *See, e.g.,* Dallas, Texas, Street Cut Standards and Implementation, Year Two Update, August 11, 2003 at 3 (noting that, because of the ineffectiveness of the city's street cut and repair code and "the increase in activity and number of users generated by the deregulation of the telecommunications industry," Dallas adopted a right-of-way management ordinance on March 1, 2001, which has resulted in joint trench projects).

[69] *See, e.g.,* American Public Works Association, Arizona Chapter Newsletter, May 2003 (Tempe, Arizona requires a joint trench plan for "any project to be constructed underground, in

(footnote continued on next page)

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public right-of-way"); Ordinance No. 99-56 of the City Council of the City of Litchfield Park, Arizona, § 7-13-4(B) ("work shall be coordinated so that to the greatest extent possible, consistent with economic feasibility, joint trenching is utilized"); Atherton, California, Ordinance § 13.08.050(D) ("[t]he city may require a person using the public rights-of-way to cooperate with others through joint trenching"); Davis, California, City Code, Chapter 8B, § 8B.02.120 (same); Broomfield County, Colorado, Code § 14-10-120(A) (joint trenching should be used "[w]henever it is possible and reasonably practicable"); State of Connecticut Code, Ch. 283, § 16-247h (shared use of facilities is encouraged); City of Cape Coral, Florida, Telecommunications Ordinance 119.00 § 25-8(e) (joint trenching "is strongly encouraged"); City of Lake Mary, Florida, Ordinance No. 1053, § 6(5) (same) ; Kissimmee, Florida, Code of Ordinances, § 14-1-76(E) (same); Palm Beach County, Florida, Ordinance No. 2001-063, § 5(1) (same); Pompano Beach, Florida, Code of Ordinances, § 100.48(D)(5) ("[t]he city may require . . . joint trenching"); Palolo, Hawaii Neighborhood Board Regular Meeting Minutes (July 10, 2002) ("[a] common trench will be used wherever possible"); Lexington-Fayette, Kentucky Urban County Government Public Right-of-Way Ordinance No. 166-2002, §17 C-7(2)(c) ("each Party . . . will make reasonable efforts to minimize the number of Surface Cuts made, and. . . if appropriate, enter into joint trenching"); Emmitsburg, Maryland Municipal Code § 16.20.020(J)(1) ("[t]he developer shall coordinate the installation of other utilities, gas, telephone, electric, TV cable, to the extent that common trench installations may be used whenever possible"); City Council Minutes of the City of Lino Lakes, Minnesota, dated January 27, 2003 ("a joint trench requirement for utilities has been added [to Ordinance No. 04-03]"); Lincoln, Nebraska, Ch. 5.17, § 320 ("the City may require that [Grantees] jointly excavate"); Texas House of Representatives, House Research Organization, Interim News, November 10, 1997 ("San Antonio's franchise agreements with Southwestern Bell, MCI, Brooks Fiber and ICG . . . also provide for a utility coordination program to minimize street cuts"); Utah Administrative Code R907-64-5(4) ("the Department may require approved Telecommunications Facility Providers to install Telecommunications Facilities . . . in a joint trench"); San Diego, California Municipal Code § 61.0509 ("[t]he City Manager may require that affected Utility Companies jointly locate their facilities in uniform trenches"); Stillwater, Oklahoma Ordinance No. 2662, § 9.1(B) ("[w]hen obtaining a permit, Grantee shall . . . investigate thoroughly all opportunities for joint trenching"); Vermont Utilities Electric Service Requirements Manual, § 511(E) ("[t]he Utility, the telephone company, and cable television shall utilize a common trench for installation of their cables, where possible"); Deerfield, Wisconsin Code § 5.13 ("[u]nless a waiver is received . . . transmission lines below ground level, which are constructed or replaced, shall be placed in a common trench"); Sheridan, Wyoming Ord. No. 1915, § 3 (Grantee may be required "to cooperate through joint trenching and other arrangements").

arrangements have proven to be extraordinarily successful, with some municipalities reporting joint trenching involving as many six to nine companies in one trench.[70]

98. Notably, municipalities and towns have not simply implemented ordinances and regulations either requiring or strongly encouraging structure arrangements, but they have also implemented a wide array of measures to facilitate the coordination that is required for such sharing. For example, because "[p]lacing multiple utilities in one common trench can result in significant cost savings to the participants and can reduce congestion in an otherwise crowded right-of-way," in some states, utility coordinating committees have published project guides and procedures which are available to utilities and carriers "to ease the coordination of joint use trenches."[71]

99. Additionally, many municipalities have implemented utility notification procedures which require utilities and carriers to provide advance notice of proposed excavations

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[70] *See* Public Right-of-Way Management: Suggestions for Local Governments – North Central Texas, by the Right-of-Way Management Guidelines Oversight Team and Public Works Council of the North Central Texas Council of Governments, February 2003. *Cf.* Arthur R. McDonald, "Success in the Trenches," Transmission & Distribution World, December 1, 2001 (noting that a joint trenching project in Charlotte involving Duke Power Co., BellSouth Co., Alltel, Concord Telephone Co., TimeWarner, Carolina Broadband, and Piedmont Natural Gas Co. "is so successful" that the joint use program will soon "spread to all areas served by Duke Power Co."); Antonio M. Prado; Community News, "Temporary road to replace 202 may be completed by Spring or Summer," February 14, 2003 (referring to roadway project involving the relocation in a common trench of the facilities of Wilmington Water, Verizon, Comcast, Cavalier, DELTRAC, and Conectiv Energy).

[71] Arizona Utility Coordinating Committee, 1999 Public Improvement Project Guide: A Guide to More Comprehensive and Timely Communications and Continuation of Project Requirements, at JNT-2.

so that other parties can participate in joint trenching whenever possible.[72] In that connection, any number of locales require companies to prepare forecasts of proposed street cuts one to five years before excavations so that joint trenching projects can be coordinated to the greatest extent possible.

100. For example, in Lincoln, Nebraska, utilities and companies are required to provide a one-year forecast of major excavations, and the city can require joint excavations to "minimize continual disruption to the right-of-way."[73] In the District of Columbia, utilities are required to submit two-year forecasts so that opportunities for joint trenching can be identified.[74] In Houston and Sacramento, utilities and companies are required to submit five year forecasts of

[72] For example, the City of Boston requires telecommunications carriers "constructing new conduit to notify all interested telecommunications providers of their intent to cut the street and to offer these providers the opportunity to have their own conduit installed at the same time . . . [and] participants in approved projects share the costs of excavation, conduit and construction . . . and street resurfacing." *Cablevision of Boston v. Public Improvements Commission of the City of Boston*, 184 F.3d 88, 92 (1st Cir. 1999). *See also* the Public Improvement Commission ("PIC") of the City of Boston Policy Relating to Grants of Location for New Conduit Networks for the Provision of Commercial Telecommunications Service (carriers must notify companies regarding proposed construction activities); Kansas City, Missouri Regional Telecommunications Model Joint Installation and Excess Conduit Policy, § 1.01(D)-1 (franchisees must certify that they have notified utilities and other parties of planned construction of underground facilities); Eugene, Oregon Administrative Order No. 58-97-21F of the City Manager of the City of Eugene, R-7.302-C(2) (providers must give notice to other parties regarding opportunity for joint trenching); Olympia, Washington, Development Guidelines and Public Works Standards, Section 4B.195 ("[e]ach utility will look for opportunities to combine projects and share trenches . . . and will provide a reasonable assurance that other utilities have been contacted and given an opportunity to participate in the project").

[73] Lincoln, Nebraska Ord. 17559, § 32, Chapter 5.17, §5.17.320.

[74] Testimony of Dan Tangherlini, Director, District of Columbia Division of Transportation, Department of Public Works on Rights-of-Way Management (July 5, 2000).

anticipated excavations.[75] To further reduce the number of multiple excavations, some municipalities and towns have imposed moratoriums on utility cuts for specified periods after streets have been opened.[76] And, in some areas, those carriers and utilities that decline an invitation to participate in structure sharing may forfeit their right to excavate in the area for a prescribed period or may be required to completely pave, rather than patch the area, once they are permitted to excavate.[77]

101. Municipalities have developed other creative incentives to encourage carriers to share their facilities. For example, the City of Sacramento "[r]efunds a portion of [the street cut] fee paid by [the] utility company during a calendar year if [the] utility demonstrates a specified high level of coordination during that year."[78] For all of these reasons, the incumbents'

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[75] City of Houston, Texas, Ordinance No. 2000-1115, § 40-144(a); Seattle Utility Cut Report at 40 (noting that Sacramento "has imposed a coordination clause asking the utilities to prepare five-year master repair plans").

[76] *See* Seattle Utility Cut Report at 36 (noting that "[m]any cities have moratoriums in their ordinances" and that "[t]ypically, moratoriums are established for 5-year periods (or less) after a street has been reconstructed, repaved or reinforced"); Seattle Municipal Code § 15.32.05(B)-(C) (noting that the Utility Coordinating Committee "shall meet at least twice a year to review and coordinate street and utility projects for the next three (3) years" and "[t]he committee shall not allow pavement cuts within three (3) years after resurfacing or reconstruction"); Hopkins, Minnesota, Ordinances & Policies, § 805.41, Subd. 1 (referring to a five-year moratorium); San Diego Union-Tribune, September 10, 2003 ("[t]he City Council voted 8-0 to force [telecommunications companies] to wait three years after the city has repaved streets before digging new trenches").

[77] *See, e.g.,* St. Louis Revised Code, § 23.42.170 ("[w]henever the plans, as approved by the board of public service, require two or more applicants for conduits to use a common trench, space or conduit, all such applicants shall carry on the work of construction in such portion as nearly as practicable at the same time and as directed by the board . . . [and] [a]ny person refusing or failing to do so shall be deemed to have waived any right to any conduit privilege in such portion").

[78] Seattle Utility Cut Report at 41.

arguments regarding *de minimis* opportunities for sharing of buried structure simply are not plausible. Given these economic and legal incentives, carriers would seek into every opportunity to engage in such sharing in a forward-looking network.

3. Underground

102. For underground structure, incumbents have argued that there are virtually no opportunities for sharing underground structure. These arguments are equally unavailing.

103. In a forward-looking network an efficient carrier would maximize its opportunity to reduce the substantial costs associated with underground construction. The construction of underground conduit structure involves excavating a trench, placing conduits, stabilizing the conduits (when multiple conduits are placed), and backfilling/restoring the area. Although underground structure may be found in all density zones, it typically is placed in more densely populated zones because it is more conducive to areas that have paved surfaces and buildings. Because underground cable is the most expensive type of investment per foot of structure and because the costs of obtaining the necessary permits, trenching, and backfilling/restoring the areas are extraordinarily high, an efficient carrier will seek every opportunity to reduce its costs by sharing its underground plant with other parties. Not surprisingly, in recent years large cities have experienced a large influx of conduit occupants other than incumbents. And the sharing of underground structures will only increase in most metropolitan areas as more carriers enter the marketplace.

104. "New builds" provide substantial opportunity for sharing of underground plant. Similarly, road widenings impacting telephone, electric, CATV, gas, and municipal services –

which occur with great frequency – offer significant opportunities for sharing of underground trenching costs. In this regard, when roads are widened and encroach on spaces occupied by a pole line, companies sharing space on the pole line frequently place their facilities underground, share the underground trenching costs, and avoid the costs associated with the installation of a new pole. Similarly, the frequent network upgrades by CATV and power companies offer additional opportunities for underground structure sharing arrangements.

105. In addition, regulatory pressures will induce or require carriers to share underground structure. As noted above, municipalities across the county, in an effort to reduce the indiscriminate opening of streets and sidewalks, strongly encourage or require joint underground trenching.

106. Furthermore, in many locales, utilities and carriers are required or strongly encouraged to run their cables in existing, or common underground conduits. Thus, for example, in Minnesota, carriers can be required "to build and install facilities in a common conduit system or other common structure" if they plan to install facilities in high-density corridors (the "designated portion of the public right-of-way within which [telecommunications] right-of-way users hav[e] multiple and competing facilities").[79] "To minimize disruption and to conserve and safeguard scarce conduit area," the local regulatory commission in Cambridge, Massachusetts, "will ordinarily authorize only one new street opening and a single common trench for

[79] Minnesota Rules, Chapter 7819.0100, Subp. 11; Golden Valley, Minnesota City Code, § 7.02; Hennepin County, Minnesota Ordinance No. 22.

underground Telecommunications Services"; applicants must "enter into good faith negotiations with interested companies . . . for joint construction, cost sharing, and joint conduit use."[80]

107. Against this backdrop, the incumbents' arguments regarding the complete lack of opportunities for underground structure sharing simply are not credible. In the long run, carriers and utilities will have even greater incentives to cooperate in joint placement of facilities, not only because of pressures from regulatory bodies, but also because of the considerable costs savings that will be achieved by such cooperation.

C. Data Sources

108. The incumbents' actual embedded sharing percentages are not and should not be dispositive in determining sharing percentages; however, other information is relevant in assessing the structure sharing opportunities that would be expected in the forward-looking network. As noted above, state codes, municipal and town ordinances, and regulations play a significant role in assessing the opportunities for structure sharing in the forward-looking network and should be considered in determining the sharing percentage used to calculate UNE prices.

109. The joint use agreements entered into by the incumbents, electric, cable television, gas companies, municipal services agencies, and private services also provide a useful framework for evaluating these issues. In state UNE proceedings, incumbents have generally

[80] Cambridge, Massachusetts, License Commission Pole and Conduit Siting Policy Relating to Grants of Location for Telecommunications Services Networks, Sections 3.2, 7.2.

objected to the production of all joint use agreements on grounds of burden; and, when they have produced such documents, they have classified them as proprietary, making it impossible for the CLECs to use them in other states served by the same incumbent. However, joint use agreements are highly relevant in evaluating the incumbents' arguments regarding *de minimis* opportunities for structure sharing; and incumbents should be required to produce such documents in state proceedings pursuant to a protective order which permits their use in other UNE rate proceedings, provided that the terms and conditions of confidentiality are met.

110. Additionally, the forecasts submitted by incumbents to municipalities regarding planned excavation activities, their applications for permits, and the minutes of meetings of utility coordinating committees in which they participate are of probative value in testing the credibility of their claims regarding the purported insurmountable obstacles that preclude sharing arrangements.

IV. LINE COUNTS

111. As the *NPRM* notes, in the *Triennial Review Order* the Commission held that ILECs will not be required to provide CLECs with unbundled access to certain high-capacity loops (dark fiber loops, DS-1 loops and DS-3 loops) in those areas where the State commission finds that CLECs are not impaired without access to such loops. The Commission further held that ILECs are not required to unbundle OCn loops at all.[81] However, regardless of whether the ILEC has an obligation to provide these high-capacity loops to CLECs, it is critical that such

[81] *See NPRM* ¶ 44; *Triennial Review Order* ¶¶ 201-202.

loops be included in the calculation of rates for two-wire loops, given the substantial facilities that two-wire and high-capacity loops share.

112. An ILEC's network includes not only two-wire analog services, but also DS-0 services, DS-1 services, DS-3 services, OCn services, and other higher-bandwidth services. The high-capacity and special access services using DS-1, DS-3, and OCn facilities share a number of facilities (and costs) with the POTS (Plain Old Telephone Service) service provided through two-wire voice grade loops. Generally, a loop follows the same path from the central office until it reaches the last portion of the network, regardless of whether it is a two-wire analog loop or a higher-capacity loop. Thus, for example, a DS-3 loop will use the same poles, conduits, trenches, and manholes as a two-wire analog loop.[82] Because both two-wire loops and high-capacity loops are capable not only of providing voice grade service but also of transmitting packetized information for DSL access and other high-speed Internet access, the sharing of facilities between these types of loops can involve both of these capabilities.

113. The feeder portion of the network also is shared by all loops, regardless of whether the feeder is copper or fiber.[83] Moreover, two-wire analog loops (via DLC), DS-1

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[82] Similarly, the interoffice transmission facility ("IOF") network, which connects each of the ILEC central offices and is necessary for the successful routing of call between wire centers, uses the same poles, conduits, trenches, and manholes as the intra-office loop plant of 2-wire and high-capacity loops.

[83] Two-wire analog and high-capacity loops also share facilities when structure is shared by feeder and distribution routes. As feeder cable traverses the feeder route, branch feeder cables intersect the main feeder route and provide facilities to the feeder route boundary. Frequently the feeder cable will use the same poles, trenches, and conduit systems as distribution cables, primarily when distribution cables serve areas immediately adjacent to feeder or branch feeder routes. Both POTS and high-capacity loops are contained in these cables and thus share the

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loops, DS-3 loops and OCn loops often will share the same fiber cable sheath in the network and often are provisioned over the same fibers. In distribution plant, high-capacity loops and two-wire analog loops often share the same route and therefore share the same structure.

114. In addition to sharing the same path from the central office, DS-1 loops often use the same copper facilities as a two-wire analog loop, either in an all-copper DS-1 or a hybrid fiber/cooper DS-1 via DLC facilities. DS-1 loops are commonly copper-based, because advances in DSL technology have not only obviated the need for signal regenerators (which are designed to overcome transmission losses in the copper), but have also allowed the same transmission rates to occur using a single pair (HDSL-2). The ILECs' current networks can typically provide loops up to at least the DS-1 level over their existing copper feeder and distribution facilities. With the use of fiber-fed digital loop carrier in feeder plant, copper pairs can support DS-1 level services and may only require a single distribution pair when the appropriate plug-in electronics are placed in the remote terminal. Even when longer copper loops are required (as may be the case when both feeder and distribution facilities are copper), the ILEC can still support DS-1 loops on copper facilities, although it may involve the use of 2 pairs of wires, rather than one pair. Thus, copper loops longer than 12,000 feet can be provisioned for DS-1 service by the installation of a "doubler" or repeater unit which extends the maximum DS-1 loop length to 24,000 feet from the central office or the DLC remote terminal.

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structure a great deal of the time.

115. Even leaving aside the shared use of copper facilities by two-wire analog loops and DS-1 loops, both loop types can be provisioned on fiber. DS-3 and OCn loops are entirely fiber, as are some DS-1 loops. Often DS-1, DS-3, and OCn loops are provisioned over the same sheath of fiber that is used to provision POTS services via DLC. Indeed, in a forward-looking network, one would expect a much higher percentage of POTS and DS-1 loops (and all DS-3 and higher-capacity loops) to be served by fiber feeder, due to the economic savings and reliability that can be attained by using fiber feeder plant and the greatly expanded bandwidth that is available with such technology.

116. High-capacity loops and two-wire analog loops also share central offices, the land on which those offices are physically located, and the entrance facilities leading into these offices. These central offices are the locations at which higher-capacity loops are interconnected and switched to interoffice transmission facilities and the ILEC's long-haul data networks.

117. DLCs are shared as well by two-wire analog loops and high-capacity loops. For example, DLCs at remote terminals are used to provide both POTS and DS-1 service, sharing the same fiber transmission path and multiplexing electronics in the central office and remote terminal. Moreover, DLCs employed today are often designed to provide DSL services through line splitting at the remote terminal. As a result, the ILECs' investments in DLC support a myriad of services. Two-wire analog loops and high-capacity loops also frequently share a number of DLC-related facilities, such as the apparatus and housing in which a particular DLC is located.

118. As a result of this substantial sharing of facilities, higher-capacity lines share a large amount of investment in support structure and other assets with two-wire analog loops. For example, based on Verizon's ARMIS reports, AT&T previously estimated the amount of shared investment in Virginia alone as more than $525 million -- more than 45 percent of Verizon's total $1.153 billion total investment in distribution and feeder cable and structure in that State. That estimate is, if anything, conservative, because it did not include such shared assets as digital loop carrier equipment and fiber optic cable.[84]

119. Because two-wire loops and higher-capacity loops share a substantial amount of network facilities, the shared costs of these facilities must be attributed to, and allocated among, all of the various services causing the associated investment in order to prevent distortion of costs and eliminate arbitrage opportunities. Treating POTS and high-capacity services as largely distinct networks would overstate the forward-looking costs of the integrated network and ignore the economies and scope and scale that are achieved by the sharing of facilities.

120. However, in order to be able properly to calculate forward-looking loop costs and attribute the costs of shared facilities among the POTS and high-capacity loops in an appropriate manner, the actual numbers of lines of each type of loop or service, including the number of each type of high-capacity loop in the ILECs' network (such as DS-1, DS-3, and OCn), must be determined. Absent accurate line counts, shared costs are likely to be disproportionately allocated to voice grade loops, thereby overstating their forward-looking costs.

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[84] *See* Application of AT&T Communications of Virginia LLC For Review, filed September 29, 2003, in CC Docket Nos. 00-218 and 00-251, at 13 & Att. 1.

121. The need to account appropriately for the sharing of facilities in the calculation of forward-looking costs is particularly important in view of two recent trends. *First*, based on demand during the last seven years, one would anticipate that, on a forward-looking basis, high-capacity loops will cover a greater proportion of the costs of the facilities that they share with high-capacity loops. Since 1996 growth in the number of switched access lines has been relatively stagnant, while the number of higher-capacity lines has dramatically increased. Indeed, in the last two years the use of wireline service actually decreased. According to a report issued by the Commission earlier this year, for example, the number of end-user lines for ILECs and CLECs (as reported by the ILECs on FCC Form 477) declined by more than 5 million lines between 2000 and 2002, from 192.5 million to 187.5 million.[85] Similarly, ARMIS data filed with the Commission indicate that, during the same two-year period, the number of access lines declined from approximately 187.6 million to 169.9 million – a decline of almost 18 million lines.[86] And the Commission's recently-released preliminary data regarding common carriers for the year ending December 31, 2002, indicate that the total number of switched access lines served by ILECs declined by more than 8 million lines from the previous year.[87]

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[85] *See Trends in Telephone Service*, Industry Analysis and Technology Division – Wireline Competition Bureau (August 2003), Table 7.1.

[86] *Id. See also Triennial Review Order* ¶ 53 n.184 (citing data, from Commission's *Local Telephone Competition December 2002 Report*, showing that ILECs' share of retail access lines declined by about nine million, or 4.7 percent, from 2000 to 2002).

[87] *See* Industry Analysis and Technology Division, Wireline Competition Bureau, *Statistics of Communications Common Carriers – 2002/2003 Preliminary Edition* (November 2003), Table 2.6; Industry Analysis Division, Common Carrier Bureau, *Statistics of Communications Common Carriers* (September 2002), Table 2.6. *See also Local Telephone Competition: Status as of December 31, 2002* (June 2003), Table 4 (showing that the total number of switched access

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122. As previously indicated, the slowing growth of switched access lines since 1996 is likely due to the availability of DSL, internet access, cellular (wireless) service, and other technologies that have reduced or eliminated the need for wireline service.[88] For example, the Cellular Telecommunications and Internet Association recently stated that nearly 7 million consumers now rely entirely on wireless service for voice telecommunications.[89] Such reliance on wireless is likely to be further encouraged as a result of recent rulings of the Commission which remove certain concerns that have made consumers hesitant to "cut the cord."[90] For example, the Commission recently ruled that wireline carriers must port numbers to wireless carriers where the requesting wireless carrier's coverage area overlaps the geographic location of the rate center in which the customer's wireline number is provisioned, as long as the "porting-in" carrier maintains the number's original rate center designation following the port.[91] This

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lines served by ILECs, including lines served through UNEs and resale, declined by approximately 5.5 million between December 2001 and December 2002).

[88] *See Triennial Review Order* ¶ 53 (finding that "3 to 5 percent of wireless customers use their wireless phone as their only phone," and that some LECs attribute at least part of the recent drop in wireless switched access lines to this replacement of wireline phones by wireless phones); *Implementation of Section 602(b) of the Omnibus Budget Reconciliation Act of 1993 – Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services*, Eighth Report, released July 14, 2003, ¶ 102 ("There is much evidence . . . that consumers are substituting wireless service for traditional wireline communications").

[89] Cellular Telecommunications & Internet Association, "Wireless Industry Urges Landline Companies to Embrace Competition, Better Serve Consumers," press release dated November 20, 2003 (found at www.wow-com.com/articles) ("CTIA release").

[90] A recent study conducted by Primetrica and Ernst & Young, for example, concluded that mobile wireless telephony poses a substantial threat to the primary fixed line connection to the home. *See Mobile Wireless as a Substitute for Primary Fixed Line Service: What Is the Potential Impact?*, May 2003 (found at http://www.primetrica.com).

[91] *In the Matter of Telephone Number Portability – CTIA Petitions for Declaratory Ruling on*
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requirement, by itself, is likely to result in the migration of millions of consumers to wireless service, because it eliminates the concern of consumers that they will need to use a different telephone number if they switch to wireless service.[92]

123. The Commission is removing an additional impediment to substitution of wireless for wireline service by requiring wireless carriers to implement, by December 31, 2005, technology that will enable them to identify the precise location of a customer making a wireless 911 call within 50 to 100 meters.[93] This will eliminate the prior concerns of consumers that if they make a 911 call using a wireless phone, emergency teams may be unable to identify the location of the customer and will thereby be delayed in providing assistance.[94]

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Wireline-Wireless Porting Issues, CC Docket No. 95-116, Memorandum Opinion and order and Further Notice of Proposed Rulemaking released November 10, 2003 ("*Intermodal Porting Order*").

[92] The Commission recently stated that this new requirement "eliminate[s] impediments to competition among wireless carriers, and between wireless and wireline carriers," because number portability promotes competition by "allowing customers the flexibility to respond to price and service changes without changing their telephone numbers." *Telephone Number Portability – United States Telecom Association and CenturyTel of Colorado, Inc. Joint Petition for Stay Pending Judicial Review*, CC Docket No. 95-116, Order released November 20, 2003, ¶ 8 ("*Number Portability Stay Denial Order*"). An analysis by The Management Network Group has predicted that an additional 19 million consumers will rely exclusively on wireless service if they are allowed to transfer their landline numbers. *See* CTIA release, *supra.*

[93] *See, e.g., Number Portability Stay Denial Order* ¶ 8; *Petition for Forbearance From E911 Accuracy Standards Imposed on Tier III Carriers For Locating Wireless Subscribers Under Rule Section 20.18(h)*, WT Docket No. 02-377, Order released November 19, 2003 (denying the request of small wireless carriers that the Commission defer until 2006 the date by which they must implement such technology) ("*E911 Order*"); "FCC Expands E911 Rules," News Release, CC Docket No. 94-102, IB Docket 99-67, released November 13, 2003.

[94] *See E911 Order* ¶¶ 14-16.

124. While the number of switched access lines has been modest since 1996, the number of special-access lines has skyrocketed – and continues to grow. Between 1996 and 2001, the number of special access lines provided by BOCs (measured as DS-0 equivalents) increased from 19.5 million to 78.6 million.[95] According to preliminary data recently released by the Commission, as of December 31, 2002, the number of special-access lines provided by BOCs had increased to 93.4 million – nearly five times the 1996 level.[96]

125. Although these data by themselves demonstrate the tremendous growth of non-switched-access lines, they actually understate the case. First, because the data describe only the special-access lines served by *RBOCs*, they understate by nearly 10 million the number of special-access lines served by *all* ILECs.[97] Second, and more importantly, because these data describe only special-access lines (*i.e.*, lines subject to special-access tariffs), they do not include the additional – and even higher – volumes of other non-switched lines, such as private lines, DSLs, and packet-related lines. For example, although BellSouth reported to this Commission

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[95] *Triennial Review Order* ¶ 45.

[96] *Statistics of Communications Common Carriers – 2002/2003 Preliminary Edition*, Table 2.6. The increased demand for high-capacity loops is the result of a number of factors. For example, the explosion in demand for cellular service has caused a correspondingly large increase in demand for DS-1 or even higher-capacity loops that terminate at cellular tower locations. To ensure adequate cellular coverage, it is essential to construct cellular towers approximately every 4 to 5 miles, especially as cellular service is being converted from analog to digital technology. Most cellular towers provide service to multiple cellular providers, and each provider typically utilizes multiple DS-1's to provide service. Another cause of the increased demand for high-capacity loops in the network is the decision of many businesses to replace their multiple basic business lines with high-capacity loops with transmission rates of DS-1 or higher.

[97] Thus, according to the Commission's preliminary data, the number of special-access lines served by all ILECs at the end of 2002 was 102.9 million, or approximately 9.6 million lines higher than the total for the four RBOCs. *Id.*

that it served approximately 18.8 million special-access lines at the end of 2002, it advised its investors that it served *more than 70 million* voice grade equivalent ("VGE") non-switched access lines during that same time period. Qwest's report to this Commission similarly described only approximately 7.2 million special-access lines served as of the end of 2002, as compared with the 64.7 million VGE non-switched lines that Qwest described in its report to investors for the same period.[98]

126. As a result of the increasing popularity of high-capacity loops, the portion of the ILECs' network capacity used for special access and other services provided by high-capacity loops has steadily increased. In many major metropolitan areas, where business demand for high-capacity services is substantial, the high-capacity volume on the feeder network (as measured in DS-0 equivalents of 24 lines for a DS-1 loop and 672 lines for a DS-3 loop) exceeds the volume of basic POTS demand in that area. In any major city, feeder routes extending from the ILECs' central offices typically intersect with the fiber cables serving business locations and corporate parks, which extensively use high-capacity loops. Moreover, ILECs in such areas frequently place fiber along these feeder routes – a practice which strongly indicates that POTS customers are not the targeted users, because the ILECs previously would have been expected to place copper feeder cables if they were serving only POTS lines.

127. *Second*, as described above in my discussion of structure sharing, state and local governments are increasingly requiring the sharing of facilities. Although those sharing

[98] These data were derived from the *Statistics of Communications Common Carriers – 2002/2003 Preliminary Edition*, *supra*, and from the Investor Relation Bulletins for BellSouth
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requirements have generally involved sharing of facilities between *carriers*, it is reasonable to expect that they will be applied with equal force to sharing of facilities by the *services* offered by the same carrier. Because the sharing requirements are intended to reduce the number of disruptions that would occur if each carrier separately sought to place additional cables. Individual carriers will also be increasingly under pressure from governmental authorities to place both copper and fiber cables or conduits (*i.e.*, for both DS-0 loops and high-capacity loops) at the same time, when streets or trenches are opened, rather than lay different cables for copper and fiber at different times. In many municipalities, authorities have encouraged structure sharing by requiring all utilities to install their facilities at the same time and prohibit additional street openings for 3-year or 5-year periods. Even leaving aside the existing governmental requirements, such sharing would occur in a forward-looking, competitive environment to the maximum extent possible in order to reduce costs and operate efficiently.

128. Given the above-described sharing of facilities and significance of high-capacity loops, line counts for the high-capacity loops in the ILEC's network (both the total number and the number of each type of high capacity loops) must be readily available if loop rates are to be calculated accurately. Such information, however, is exclusively in the possession of the ILECs, which do not regularly report such data or otherwise make it publicly available. For example, the ARMIS reports filed by ILECs do not provide a detailed breakdown of the number of each type of high-capacity loop in the ILEC's network. ARMIS Report 43-08 requires ILECs to identify the total number of special access (non-switched) lines in only two categories: analog (4

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and Qwest for the fourth quarter of 2002.

kHz or equivalent) or digital (64 Kbps or equivalent). ILECs are not required to separately identify the number of lines for each type of high-capacity loop (DS-1's, DS-3's, or OCns). Even as to switched services, ARMIS Report 43-08 does not require the ILEC to identify the type of loop used.[99]

129. Because ARMIS reports do not provide detailed breakdowns of line counts for high-capacity loops, CLECs have attempted to obtain such data from the ILECs in UNE rate proceedings. However, in a number of States – including Virginia, Maryland, and Pennsylvania – ILECs have refused to provide such data. In the recent *Virginia Arbitration* proceeding, for example, Verizon argued that shared costs should be allocated based on physical pairs, rather than on the basis of DS-0 equivalents. However, when AT&T submitted a discovery request for special access lines on a physical pair basis, Verizon objected on the ground that such production would be unduly burdensome and would require a special study to provide data on special access lines on a physical pair basis. Although Verizon ultimately provided some data in response to the discovery requests, it did so only after nearly three months had passed since the CLECs submitted the requests. In fact, Verizon produced the data so late in the proceeding that the CLECs did not have sufficient time to fully evaluate the data and incorporate it into their cost study before they were required to submit surrebuttal testimony.

130. There is no reason why an ILEC cannot provide detailed line counts for each type of high-capacity loop that it serves, as well as line counts for its two-wire analog loops. For

[99] Report 43-08 simply requires ILECs to identify the number of switched business access lines by two categories (single-line and multiline) and the number of switched residential lines by

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example, in UNE rate proceedings in Utah, Oregon, and Washington State, Qwest provided line counts, by wire center, for switched and non-switched DS-1 lines (including line counts for such sub-categories of DS-1's as Primary Rate ISDN loops), for DS-3 and OCn lines, and for ISDN-BRI lines. In addition, Verizon itself supplied line counts for its DS-1 and DS-3 loops in the current UNE rate proceeding in Washington State.[100] In California, both SBC and Verizon provided line counts for various loop types. The production of such data by the ILECs in these proceedings belies any notion that the data would be burdensome for the ILEC to produce or are otherwise unavailable.

131. In some previous state proceedings involving determinations of UNE rates, ILECs have attempted to downplay the importance of shared costs between two-wire loops and high-capacity lines by disputing the extent to which such sharing actually occurs in their embedded networks. But even leaving aside the fact that substantial sharing of facilities *does* currently occur, the ILECs' current networks do not reflect the opportunities for sharing in a forward-looking network, where (for example) fiber feeder is used in the local loop to provide eventual service to two-wire loops.

132. Given their failure to provide detailed line count information regarding high-capacity loops, it is apparent that the ILECs will not make such information available in state

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three categories (lifeline, non-lifeline/primary, and non-lifeline/non-primary).

[100] Copies of the non-confidential responses of Qwest and Verizon to AT&T's requests for such data in Washington State are attached hereto as Attachments C and D, respectively. Both Qwest and Verizon, however, classified the actual line count data that they produced as proprietary, thereby precluding their use in any other proceeding.

proceedings to determine UNE rates unless expressly obligated by the Commission to do so, in order that the full economies and scope and scale realized by shared costs can be taken into account in determining forward-looking rates. Thus, the Commission should require that the ILECs provide line counts of all loops they serve, *by loop type and by wire center*, to CLECs in any UNE rate proceeding before a State commission (or, alternatively, should be required to include such information in their ARMIS reports). Such data should be produced not only for the current time period but also for a reasonable historical period, along with any forecasts of demand for these services.

133. The *Virginia Arbitration Order* recently held that "Because two-wire loops and higher capacity loops share network facilities, the correct economic approach to pricing [two-wire loops] would be to assign to DS-0 loops their directly attributable incremental costs plus a share of the joint facilities costs of providing DS-0 loops and high-capacity loops."[101] Without reliable line count data for high-capacity loops, however, shared costs cannot properly be allocated – and forward-looking rates for loops cannot be accurately calculated. Indeed, without access to such data, the rates for voice grade loops calculated by State commissions are likely to exceed forward-looking costs.

V. NETWORK ROUTING AND CONSTRUCTION

134. The *NPRM* asked whether the Commission should "adopt routing assumptions more closely tied to an incumbent LEC's existing network," such as "extend[ing] the assumption

[101] *Virginia Arbitration Order* ¶ 212.

of existing switch location to other parts of the network (*e.g.,* existing feeder routes, existing remote terminal locations)."[102] As Mr. Klick explains in his Declaration, such an approach would make sense *only* if an efficient provider entering the market today would use the same serving areas, SAIs, FDIs, and remote terminals as those in the ILEC's current network, given current customer locations and service demand patterns. Clearly, however, an efficient new entrant would not do so, because such a course of action would replicate the inefficiencies of the ILEC's existing network.

135. An efficient provider, for example, would not duplicate a ILEC's existing DLC deployment. DLCs were first deployed in 1980, when the Carrier Serving Concept was implemented. Many existing DLC systems were installed in locations to meet an immediate customer demand and were not always placed in most optimum location. Furthermore, many smaller-capacity DLC systems were deployed that would not efficiently meet customer requirements in a forward-looking network today.

136. Enhancements in DLC equipment since the 1980's have enabled ILECs to construct larger CSAs and serve customers with fewer DLCs, at less cost than in the past. Additionally, an efficient provider may utilize a smaller number of feeder routes than would have been required in the past, because modern DLC systems utilize SONET and Add Drop Capabilities of modern multiplexing equipment to connect DLC systems to the central office. And, as described above in my discussion of the issue of fill factors, the more recent CSA design enables ILECs to serve customers with reduced levels of spare capacity.

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[102] *NPRM* ¶ 64.

137. The CSA is an engineering design concept in which the wire center area or boundaries are sectionalized into discrete geographical areas that would ultimately be fed with fiber/DLC. During the planning process, CSAs are established for the entire wire center, including those distribution areas adjacent to the central office.

138. As described above in my discussion of fill factors, the newer next generation digital loop carrier equipment requires less transport capacity than was possible using older equipment. In addition, the development of this NGDLC equipment has enabled ILECs to reduce the number of remote terminal sites (thus reducing the ILECs' costs), while effectively expanding the size of CSAs in terms of customers served. The capacity of current NGDLC equipment is at least 2,016 POTS lines – three times the 672-POTS line capacity of older DLC equipment. Thus, far fewer transport facilities are now required to serve a given number of customers. At the same time, because CSAs are defined in terms of lines served by DLC, the increased line capacity of NGDLC has effectively reduced the overall number of CSAs, thereby effectively enlarging individual CSAs.[103]

139. The current CSA design rules provide economic benefits to ILECs while enabling the ILECs' outside plant network to support both broadband (*i.e.*, DSL) and narrowband (*i.e.*, voice) technologies. In addition, the capacity and enhanced capabilities of modern DLC

[103] For example, 2,016 customers can now be served by a single NGDLC remote terminal, whereas three DLC remote terminal sites would have been required in the past to serve the same number of customers when DLCs had a capacity of only 672 POTS lines. The enlargement of capacity effectively reduces the number of necessary CSAs from three to one – and, therefore, a single CSA serving 2,016 POTS customers now encompasses the three CSAs that previously existed.

systems have made fiber-fed DLC the preferred feeder technology. In fact, most ILECs have restricted the termination of any more copper feeder cable pairs in the central office and prefer that all new feeder requirements utilize fiber-fed DLC as the most efficient feeder alternative.

140. To address customer concentrations even more efficiently, DLC systems are available in outdoor cabinets with sizes up to 2,016-line capacity, which enables an ILEC to install the current version of DLC and reduce the number of DLCs required. For large building complexes, DLC systems are also available in central office rack configurations and customer premise enclosures.[104]

141. In short, a new entrant would not construct the same carrier serving areas, SAIs, FDIs, and remote terminals that are in the ILECs' current embedded networks. Rather than use these inefficient networks, an entrant would use the more efficient technology that is currently available – which would enable it to construct larger serving areas, and to serve existing customers more cheaply with fewer remote terminals, a smaller number of feeder routes to connect the remote terminals to the serving central office, and lower required levels of spare capacity.

[104]In a limited number of situations where large concentrations of customers economically justify the investment, numerous DLC systems can be installed in controlled environmental vaults. However, due to their higher costs, placement considerations, and the need to extend feeder cables to serving area interfaces ("SAIs"), only a limited number of CEVs are currently being installed. An efficient provider designing a forward-looking network would utilize outdoor enclosures for most DLC installations because they enable engineers to efficiently meet customer requirements and minimize cooper feeder cable extension to service area interfaces.

VI. LOOP CONDITIONING

142. The *NPRM* asked for comments "on when and how the costs associated with loop conditioning should be recovered."[105] As Ms. Murray explains in detail in her Declaration, any separate charge for loop conditioning would be inappropriate, because it would be inconsistent with forward-looking cost principles.

143. I should note that, in the context of the issue raised by the Commission, the term "conditioning" is a misnomer. That term has traditionally been used in the telecommunications industry to refer to situations where equipment must be *added* to a circuit in order to enable that circuit to meet stricter engineering parameters. By contrast, the "conditioning" to which the *NPRM* refers is the *removal* of bridged taps, load coils, and other equipment from the circuit in order to make a loop in its embedded network DSL-capable. Thus, the task to which the *NPRM* refers would more appropriately be called "deconditioning." Nonetheless, for purposes of this discussion, I will use the term "conditioning."

144. Any separate charge for the conditioning of a loop would not reflect an efficient, forward-looking network architecture. The premise that an ILEC must remove load coils, excessive bridged taps or repeaters to render a loop suitable for the provision of DSL-based services is based on the ILEC's embedded network. A forward-looking network architecture would not contain such load coils, excessive bridged taps or repeaters, because they violate network engineering guidelines that have been in place for over two decades.

145. A forward-looking network is designed to meet Carrier Serving Area design guidelines, which have been the industry standard since 1980. Those guidelines call for a loop architecture that does not deploy load coils, excessive bridged taps or repeaters (all of which inhibit the provision of advanced services such as ISDN and DSL) on cable pairs. In fact, the Serving Area Concept ("SAC") Guidelines that were first implemented in 1972 (as the outside plant engineering design guidelines) called for the elimination of bridged taps.

146. In other words, a network built to CSA guidelines does not include inhibitors such as load coils and excessive bridged taps that require loops to be "de-conditioned" before they can be used to provide DSL-based services. The ILECs have been planning and designing their networks under the CSA guidelines that have been in effect since 1980. If the ILECs had fully adhered to those guidelines, few (if any) loops requiring conditioning would exist in their networks today.[106] Excessive bridged taps on cable pairs should have been eliminated starting in 1972, when the SAC concept was implemented. Also, to the extent that long-route physical copper feeder cables were being replaced with Digital Loop Carrier systems, any load coils still remaining in the feeder portion of the local network should have been eliminated by this time.[107]

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[105] *NPRM* ¶ 130.

[106] The CSA guidelines that have been in effect since 1980 allow bridged taps only if they do not exceed 2,500 feet, and prohibit any single bridged tap from exceeding 2,000 feet in length. However, there are few, if any, circumstances where bridged taps could or should be used even if they otherwise meet the CSA guidelines. Some loops, for example, cannot function properly if they include a bridged tap, regardless of the length of the tap.

[107] Because the average plant life for copper cable is approximately 15 years, any cables that have load coils have outlived their projected lives and therefore have been fully depreciated.

147. The *NPRM* asks whether ILECs should be permitted to assess separate charges for the conditioning of copper loops longer than 18,000 feet.[108] The answer is no, because even loops of such length would not require conditioning in a forward-looking network. According to the CSA engineering design rules, loops over 18,000 feet in length should be provisioned over Digital Loop Carrier systems, so that load coils are never required. In other words, Digital Loop Carrier systems are the current technology that achieves the same end as load coils did decades ago.

148. Paying for conditioning *and* for placing Digital Loop Carrier systems would thus be paying for the same capability twice. That would constitute an improper windfall for the ILEC. Stated otherwise, in order to support DSL, a CLEC would incur *either* the cost to "condition" the loop (if that loop is a very old copper loop) *or* the cost to place a Digital Loop Carrier system (a recurring cost) if one was using modern plant – but not both charges.

149. One of the ILECs, Verizon, has admitted that a forward-looking network would not require "conditioning" to provision DSL-capable loops. Indeed, Verizon's witness Francis J. Murphy argued in a recent universal service proceeding before the Public Service Commission of Maryland that minimization of "conditioning" costs is a critical attribute of a forward-looking network. According to Mr. Murphy:

> In its First Report and Order, the FCC mandated that ILECs condition loops for data transmission if technically feasible. Therefore, it is in the interest of both ILECs and their competitors

[108] *NPRM* ¶ 130.

> that the forward-looking network used to provide both UNEs and basic service be constructed in a manner that will minimize conditioning costs.[109]

150. Several State commissions have concurred that ILECs should not be permitted to assess a separate charge for conditioning, because no conditioning would be required in a forward-looking network. The Massachusetts Department of Telecommunications and Energy ("DTE") recently found that "an efficiently designed forward-looking network would not consist of copper loop lengths in excess of 18,000 feet, so that loop conditioning would not be necessary."[110] Similarly, the DTE denied Verizon's request to charge for the conditioning of loops greater than 18,000 feet, "since those loops would be fiber in a forward-looking network."[111]

151. The Public Service Commission of Maryland similarly found that:

> Based upon the Commission's and the FCC's pricing guidelines, rates for the line sharing UNE are required to be based upon a forward-looking network. In such a network, loop conditioning, or rather de-conditioning, would not be required for a fiber-fed loop, and the only existing copper loops would be less than 18,000 feet for which Verizon has indicated there will be no charge.

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[109] Rebuttal Testimony of Francis J. Murphy on behalf of Verizon Maryland in Maryland Public Service Commission Case No. 8745, May 21, 2001, at 22.

[110] *See Investigation by the Department of Telecommunications and Energy on its own Motion into the Appropriate Pricing, based upon Total Element Long-Run Incremental Costs, for Unbundled Network Elements and Combinations of Unbundled Network Elements, and the Appropriate Avoided-Cost Discount for Verizon New England, Inc. d/b/a Verizon Massachusetts' Resale Services in the Commonwealth of Massachusetts*, D.T.E. 01-20, Order issued July 11, 2002, at 259.

[111] *Id.*

> As noted earlier, Verizon has argued that the FCC's *Line Sharing Order* expressly allows them to recover loop-conditioning costs. The Commission disagrees with this interpretation. The FCC's directives related to recovery of loop conditioning costs are only relevant to states that have assumed copper feeder for purposes of calculating forward looking costs. The FCC has not directed states to assume copper feeder in calculating these costs. Without such a directive, it would be illogical for the FCC to mandate recovery of costs that are relevant only to a network assumption that may not have been approved in a particular state.[112]

152. The Utah Public Service Commission has likewise found that:

> A TELRIC model (or a forward-looking, efficient provider) would not design a network that required loops to be conditioned or groomed before services today's customers expect could be provided. It follows, and we so conclude, that the buyer of an unbundled loop should not have to pay for any such upgrading: the price of the loop presupposes sufficient quality, by which is meant a loop capable of meeting not just current demands but demands for advanced services as well. Accordingly, we disallow charges for line conditioning or grooming.[113]

153. Finally, although ILECs have argued that loop conditioning is a one-time, nonrecurring activity, conditioning is part of the maintenance that ILECs routinely perform in order to maintain their existing loop plant. For example, ILECs typically re-engineer older loop plant to eliminate load coils and other DSL inhibitors when growth or maintenance activities

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[112] Maryland Public Service Commission, *In the Matter of Arbitration of Rhythms Links, Inc. and Covad Communications Company v. Bell Atlantic-Maryland, Inc. Pursuant to Section 252(b) of the Telecommunications Act of 1996,* Case No. 8842 (Phase II), Order No. 76852, issued April 3, 2001, at 34-35 (footnotes excluded).

[113] Utah Public Service Commission, *In the Matter of an Investigation Into Collocation and Expanded Interconnection*, Docket No. 94-999-01, Phase III Part C Report and Order issued June 2, 1999, at 13 (footnote omitted).

generate work orders that require an upgrade to the existing plant in any specific area. Thus, the costs associated with conditioning are among the regular maintenance costs of an ILEC.

154. This concludes my declaration.

I hereby declare under penalty of perjury that the foregoing is true and accurate to the best of my knowledge and belief.

Executed on December 16, 2003

/s/ Joseph P. Riolo
Joseph P. Riolo

ATTACHMENT A

JOSEPH P. RIOLO
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PROFESSIONAL EXPERIENCE

TELECOMMUNICATIONS CONSULTANT 1992-Present

- Expert witness before the FCC and State Public Utilities Commissions.
- Engineering witness on behalf of AT&T, MCI Worldcom, Covad Communications, Rhythms Links Inc., Bluestar, BIRCH TELECOM, IP Communications, McLEODUSA Inc., NuVOX Communications, XO MISSOURI, Inc., CLEC Coalition and Mid-Maine Telephone Company.
- Testified in 21 jurisdictions on behalf of clients.
- Provided consulting services for the design, project management and implementation of a national DSL company network.
- Provided consulting services to equipment staging, assembly and installation company.

NYNEX 1987-1992

- Between 1987 and 1992, I was the NYNEX Engineering Director-Long Island. In that position, I was responsible for budgeting, planning, engineering, provisioning, assignment and maintenance of telecommunications services for all customers on Long Island, N.Y.

NYNEX 1985-1987

- Between 1985 and 1987, I was NYNEX District Manager-Midtown Manhattan. I was responsible for budgeting, planning, engineering, provisioning, assignment and maintenance of telecommunications services for all customers in Midtown Manhattan.

NYNEX 1980-1985

- Between 1980 and 1985, I was NYNEX District Manager-Engineering Methods. In that capacity, I was responsible for the design, development, implementation and review of all outside plant methods and procedures for New York Telephone Company. Additionally, I was responsible for the procurement of all outside plant cable and apparatus for the New York Telephone Company.

AT & T 1978-1980

- Between 1978 and 1980, I was an AT&T District Manager, responsible for the design, development and documentation of various Bell System plans, and for audits and operational reviews of selected operating companies in matters of Outside Plant engineering, construction, assignment and repair strategy. I also served as the Project Team Leader at Bell Telephone

Laboratories for the design and development of functional specifications for mechanized repair strategy systems.

NEW YORK TELEPHONE 1976-1978

- Between 1976 and 1978, I was District Manager-Outside Plant Analysis Center for New York Telephone Company. I was responsible for the analysis of all outside plant maintenance reports and the design, development and implementation of related mechanized reporting, analytical and dispatching systems. I was also responsible for the procurement of all outside plant cable and apparatus for the New York Telephone Company.

VARIOUS

- Between 1962 and 1978, I held a variety of technical and engineering positions of increasing responsibility at New York Telephone and Bell Telephone Laboratories. During 1967 and 1969, I was on military leave of absence from New York Telephone while serving in the U.S. Navy.

EDUCATION

I hold a B.S. in Electrical Engineering from City College of New York, and have taken a variety of specialized courses in telecommunications since college.

RECENT TESTIMONY

State of Maryland	Docket No. 8731 Phase I, Case No. 8842 Case No. 8745, Case No. 8879
Commonwealth of Virginia	Case No. PUC 970005, PUC 990101
State of New Jersey	Docket No. TX95120631 TX98010010
State of Pennsylvania	Docket No. A310203F0002 et al, MFSIII Docket No. R-00005261, R-00016683
State of West Virginia	Case Nos. 96-1516-T-PC 96-1561-T-PC 96-1009-T-PC 96-1533-T-T
State of California	Case Nos. R.93-04-003 I. 93-04-002
State of Wisconsin	Docket Nos. 6720-MA-104 3258-MA-101
District of Columbia	Formal Case No. 962
State of Delaware	PSC Docket No. 96-324
State of Iowa	Docket No. RPU 96-9
State of Hawaii	PUC Docket No. 7702
FCC	File No.E98-05, Docket No.98-147,96-98, Docket Nos. 00-218, 00-219, 00-251
State of Illinois	Docket No. 99-0593, 00-0312, 00-0313 98-0396, Advice No. 7280,

00-0596

State of New York	Case No. 98-C-1357
State of Massachusetts	DTE 98-57 III
State of Ohio	Case No. 96-922TP-COI
State of Michigan	Case NO U-12465
State of Florida	Docket No. 990649-TP, Docket No. 001797-TP
State of Georgia	Docket No. 11900-U
State of Missouri	Case No. T0-2001-439
State of Maine	Docket No. 98-593

ATTACHMENT B

State/Municipality	Information Regarding Structure Sharing
Alaska	"(h) An electric or telephone utility that has overhead utility distribution lines and that provides services in a municipality with a population of more than 200,000 must spend at least one percent of the utility's annual gross revenue from retail customers in that municipality to place existing overhead utility distribution lines in that municipality underground. In determining the annual gross revenue under this subsection, only revenue derived from the utility's distribution lines in the municipality shall be considered. (i) An electric or telephone utility that is implementing a program to place existing overhead utility distribution lines located in a municipality underground may amend its rates for services provided to customers in the municipality to enable the utility to recover the full actual cost of placing the lines underground. Notwithstanding AS 42.05.411 - 42.05.431, an amendment to a utility's rates under this subsection is not subject to commission review or approval. A utility amending its rates under this subsection shall notify the commission of the amendment. This subsection applies to an undergrounding program to the extent that the costs do not exceed two percent of the utility's annual gross revenue. If an undergrounding program's costs exceed two percent, the commission may regulate rate increases proposed for the recovery of the amount above two percent. (j) When an electric utility or a telephone utility is implementing a program to place existing overhead utility distribution lines located in a municipality underground, any other overhead line or cable in the same location shall be placed underground at the same time. Each entity whose lines or cables are placed underground shall pay the cost of placing its own lines or cables underground." Alaska Statutes, § 42.05.381. (http://touchngo.com/lglcntr/akstats/Statutes/Title42/Chapter05/Section381.htm)
Arizona	" "Due to substantial costs of construction to municipal roadways and other improved surfaces, it has become increasingly popular that municipalities require that any improvement or extension to an existing facility in public right-of-way be constructed with joint use applications being considered by all utility companies in that municipality. The purpose of this requirement reduces end-to-end consecutive projects by utility companies, and it reduces the number of excavations and improvements required for total restoration of the surface. Road closure costs and traffic restrictions in large metropolitan areas pose a negative situation, thus joint trench and joint installations eliminates multiple closures and excavations to complete improvements within public right-of-way. In Arizona, there are several communities that require any entity planning an

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	underground installation to first contact every utility or company that has or could have facilities in the defined project limits. Each utility must review the plan and accept or decline the potential of a joint use installation. In some cases in several municipalities, if a declination is received, the declining utility will be refused future installations or will be assessed additional fees in placement of facilities in that specific area in the future. The City of Tempe, in Arizona, requires that any project to be constructed underground, in public right-of-way implement a joint trench plan. The primary project owner then must contact each and every utility that could possibly place facilities at the site under consideration. Usually, the primary owner of the project will call for a utility inventory, which can be accomplished by utilizing the state one call center's member database. When an inventory has been assembled, they then must contact and submit their plan to each company to either accept or decline the joint trench. Once this process is complete, all accepting utilities must then submit plans to the primary utility for inclusion to their project, and ultimate placement of facilities in the excavated trench." American Public Works Association, Arizona Chapter Newsletter, Patrick Holmes, "Joint Trenching," May 2003 (http://arizona.apwa.net/arizona/documents/Newsletter%20May%202003%20Distiller.pdf)
Arizona (Litchfield Park)	"In order to minimize degradation of streets, traffic impacts and other interferences with the use of public rights-of-way, work should be coordinated so that to the greatest extent possible, consistent with economic feasibility, joint trenching is utilized." Ordinance No. 99-56 of the Council of the City of Litchfield Park, Arizona, Section 7-13-4(B). (http://www.litchfield-park.org/forms/pdf/ordinances/99-56ROWUtility3.pdf)
Arizona (Mesa City)	"Cable television shall utilize common or joint trench with telephone and/or utilities for undergrounding when a developer provides a trench for undergrounding by negotiating a joint trench agreement with those utilities." Mesa City Code § 9-7-13(A). (http://www.ci.mesa.az.us/clerk/CodeBook/Title_9/Chapter_7/Section_13.asp)
Arizona (Tempe)	After reviewing the permit application for construction in the public rights-of-way, the City Staff will conduct a review which includes "verifying that all joint trench opportunities have been incorporated into the design. . . . The City requires that all permitted projects comply with the Arizona Utility Coordinating Committee project models, including the Joint Trench Use Model and the Western Underground Trench Formula." City of Tempe, Arizona, Utility Permit Manual, July 11, 2002. (http://www.tempe.gov/engineering/utility_permit_manual.htm)
Arkansas	"In Northwest Arkansas, several organizations are making increased use of joint trenching. Arkansas Western Gas, Prairie Grove Telephone and SBC have worked together in new subdivisions to achieve cost savings during the installation phase.

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	It also reduces the chance of damages (more cost savings) that frequently occur when the second, third or fourth utility is being installed in the same right-of-way." Arkansas One-Call, "Trench Sharing for Safety and Savings" (http://www.arkonecall.com/News/Stories_From_the_Front_Lines/Joint_Trenching.htm)
California (Atherton)	"Interference with the use of the public rights-of-way by others, including others that may be installing cable communications systems, must be minimized. The city may require a person using the public rights-of-way to cooperate with others through joint trenching and other arrangements to minimize adverse impacts on the public rights-of-way and public property." Atherton, California, Ordinance § 13.08.050(D). "Unless it is impracticable, owners of cable communications systems should use existing poles and conduit." *Id.* § 13.08.050(E). (http://www.ci.atherton.ca.us/municipal.html)
California (Brentwood)	The developer of a 2-acre parcel that is being divided into two parcels "shall provide joint trenching for telephone, gas, electric, cable TV and fiber optic service." Brentwood Planning Commission, Resolution No. 01-90, December 18, 2001. (http://www.ci.brentwood.ca.us/boards/planning/planpastagendas/plan_agenda_2001/packet011218/Item2.cfm)
California (Davis)	"(d) Interference with the use of the public rights-of-way by others, including other that may be installing cable communications systems, must be minimized, and any interference shall only be the result of implementing permit conditions. City may require a person using the public rights-of-way to cooperate with others through joint trenching and other arrangements to minimize adverse impacts on the public rights-of-way. . . . (e) To the extent possible, operators of cable communications systems shall use existing poles and conduit." Davis, California, City Code, Chapter 8B -- Cable Systems And Open Video Systems, Section 8B.02.120 -- General Conditions upon Construction, Operation and Repair, Paragraphs (d) and (e). (http://www.city.davis.ca.us/cmo/citycode/detail.cfm?p=8B&q=2220)
California (Fontana)	"The City of Fontana is pleased to announce the start of construction of the Rule 20A – Underground Utility District 4, Phase II, Sierra Avenue between Randall Avenue and Orange Way. The project is funded pursuant to the California Public Utility Commission (CPUC) regulation for Rule 20A. . . . The construction project consists of the excavation of a common joint trench allocation for all three of the utility lines mentioned above, next to the edge of gutter on the pavement along both sides of Sierra Avenue. Additionally there will be excavation along certain stretches within the sidewalk area for the installation of concrete vaults and installation of street safety lighting on ornamental poles. The first part of the project began construction on September 8 , 2003 and is expected to be completed by January 11, 2004.

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	The second part of the project, which involves converting the overhead lines to the underground conduits, connection to existing services and removing all wood poles will be completed by September 2004. " Fontana, California, Press Release, September 15, 2003 (http://www.fontana.org/main/pr_releases/2003/undergrd_utility.htm)
California (Mountain View)	The City Council of Mountain View, California, "[a]uthorize[d] the City Manager to execute encroachment agreements with TCG San Francisco . . . and Pacific Bell Telephone Company . . . to install and operate telecommunications facilities within the public right-of-way. . . . the revised agreement still requires companies to cooperate in good faith in the [sic] planning, locating, and constructing telecommunications facilities in joint trench or common duct banks with other similar utilities to minimize street cuts and conflicts." City of Mountain View, City Council Agenda, October 22, 2002, Item 4.9 on Consent Calendar, Encroachment Agreements for Telecommunications Facilities. (http://www.ci.mtnview.ca.us/citygov/council/agendas/pdf/102202_4-9.pdf)
California (Plumas County)	"(a) Any poles, wires, cable lines, conduits, or other properties of the grantee to be constructed or installed in streets or other public property under the franchise shall be so constructed or installed only at such locations and in such manner as shall be approved in advance by the Public Works Director. (b) In those areas and portions of the County where both the transmission and distribution facilities of the public utility providing telephone service and those of the utility providing electric service are underground or hereafter may be placed underground, then the grantee shall likewise construct, operate, and maintain all of its transmission and distribution facilities underground at the grantee's sole cost and expense. Amplifiers in the grantee's transmission and distribution lines may be in appropriate housings upon the surface of the ground. Installations shall not interfere or conflict with any installation of the County or of any other utility serving the County. (c) Notwithstanding the provisions of subsections (a) and (b) of this section, in all subdivisions or structures constructed after October 9, 1984, in which utilities are to be installed underground, cable television facilities shall be so installed to serve such subdivisions or structures at the same time as, and, unless impractical, in a common trench with, such utilities. (d) In cases of new construction or property development where utilities are to be placed underground, the developer or property owner shall give notice to the grantee no later than the time of notice to the public utilities. Such notices of such construction or development shall consist of the particular date on which open trenching will be available for the grantee's installation of conduit, pedestals, and/or vaults. The grantee shall provide specifications as needed for trenching." Plumas County Code § 7-13.13, (§ 1, Ord. 84-588, eff. November 8, 1984) (http://www.countyofplumas.com/codes/index.htm)
California (San Bernardino County)	"There has been a significant increase in the number of applicants to install underground telecommunication and cable television facilities in the County. Competitive local exchange carriers; competitive access providers, inter-

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	exchange carriers, cable television companies and others have filed applications for permits. The substantial increase in construction activity has caused and has the potential to cause a material and adverse impact on: street surface life, pedestrian and vehicle traffic flow, quality of life in residential areas, and the conduct of commerce in general by retail businesses in the County. In addition, the increase in construction activity has affected the ability of the County's staff to process applications, monitor construction practices, inspect new facilities, and handle traffic flow problems. Therefore, the County of San Bernardino has decided to require applicants for permits to provide supplemental information in order to determine, among other things: whether applicants can share facilities, whether the proposed facilities will be used for activities that are subject to regulation by the County, the state and/or the federal government, and whether the proposed manner, timing and place of construction presents the best balance between a minimal impact on County facilities and quality of life on the one hand and the applicant's business purposes on the other." San Bernardino, California, Rights-of-Way Users Questionnaire (www.scannatoa.org/pdf/ Right%20Of%20Way%20Questionnaire.doc)
California (San Diego)	**"§61.0508 Council May Designate Underground Utility Districts by Resolution** (a) If, after the public hearing, the Council finds that the public health, safety or general welfare requires removal of *Poles, Overhead Wires, and Associated Overhead Structures* and underground installation of wires and facilities for supplying electric, communication, community antenna television or similar or associated service within a designated area, the Council shall by resolution declare the designated area an *Underground Utility District* and order the removal and underground installation. Immediately following its adoption, the City Clerk shall cause a certified copy of the resolution to be recorded in the office of the County Recorder. The resolution shall include a description and map of the area comprising the *District.* (b) To facilitate the City Council's long term planning of *Underground Utility Districts*, each *Utility Company* within the City with *Overhead Poles, Wires, and Associated Overhead Structures* shall provide the City Manager with a complete list of the locations of all of its overhead facilities within the City. The list shall be updated annually not later than January 31 of each year, and shall be in a form prescribed by the City Manager. Any *Utility Company* failing to comply with Section 61.0508 shall be subject to a fine not to exceed $1,000 per day for each day the annual updated list remains overdue. *(Amended 1-14-2002 by O-19032 N.S.)* **§61.0509 Establishment of Underground Utility District Joint Trench Requirements,** **Schedules, and Deadlines** (a) Upon adoption of a resolution creating a *Utility Underground District* by the City Council, the City Manager, in consultation with all affected *Utility*

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	Companies, shall establish a schedule for the underground conversion of all *Poles, Overhead Wires, and Associated Structures* within the *District.* Upon adoption of such schedule by the City Manager, all affected *Utility Companies* and *Affected Persons* shall be subject to performing their respective underground conversion obligations in a timely and efficient manner in accordance with the schedule. *Poles, Overhead Wires, and Associated* *Overhead Structures* shall be removed. A reasonable time shall be allowed for removal and underground installation, having due regard for the availability of labor, materials, and equipment necessary for such removal and for the installation of such underground facilities. (b) The City Manager may require that affected *Utility Companies* jointly locate their facilities in uniform trenches. All affected *Utility Companies* within the *District* shall coordinate joint trenches for the conversion of their *Poles, Overhead Wires, and Associated Structures,* and shall comply with any reasonable schedule established by the City Manager for joint trenches, except as provided by Section 61.0510. (b) [sic] Unless otherwise specified by the City Manager or agreed between affected *Utility Companies,* the *Utility Company* providing electric service shall be responsible for the coordination of joint trench requirements with other *Utility Companies,* provided, however, that no *Utility Company* shall be responsible for the enforcement of this Division, for the failure of other affected *Utility Companies* or *Affected Persons* to comply with the requirements of this Division, or for delays caused solely by the City. Any *Utility Company* or *Affected Person* failing to meet the requirements of this Division due to its own action or inaction shall be subject to the penalties and other remedies specified in Section 61.0511." San Diego, California, Municipal Code, §61.0508, §61.0509(a)-(b). (http://clerkdoc.sannet.gov/legtrain/mc/MuniCodeChapter06/Ch06Art01Division05)
California (San Diego)	"San Diego has set a series of new rules and fees to prevent utility and telecommunications companies from damaging city streets that have recently been repaired… The City Council voted 8-0 to force those businesses to wait three years after the city has repaved streets before digging new trenches on them, except in the event of emergencies… The city set up a fee structure for when such emergency repairs are necessary and made it mandatory for crews to resurface the whole street after digging trenches, rather than leaving patchworked blocks behind." San Diego Union-Tribune 9/10/03 (http://www.imakenews.com/calrac/index000038564.cfm)
California (San Francisco)	"(a) **Five-Year Plans.** (i) On the first day of April and October, or the first regular business day immediately thereafter, each utility and municipal excavator shall prepare and submit to the Department a plan, in a format specified by the Department, that shows all major work anticipated to be done in the public right-of-way in the next five years. Any utility or municipal excavator that does not propose major work in the next five years shall submit a plan with a statement that no such major work is

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	anticipated and shall immediately report any major work to the Department as soon as it becomes reasonably foreseeable. (ii) The Department may disclose information contained in a five-year plan to any utility excavator or municipal excavator only on a need-to-know basis in order to facilitate coordination among excavators and to avoid unnecessary excavation in City streets. To the maximum extent permissible under federal, State, and local laws applicable to public records, the City shall not otherwise disclose to the public any information contained in a five-year plan submitted by a utility excavator that is proprietary, trade secret or is otherwise protected from disclosure; provided, however that the City shall have no duty to decline to disclose any information that the utility excavator has not identified on its face as proprietary, trade secret or otherwise protected from disclosure. The Department shall notify a utility excavator of any request for inspection of public records that calls for disclosure of any five-year plan on which any information has been identified as proprietary, trade secret or otherwise protected from disclosure. The Department shall consult with the City Attorney regarding any such request and shall inform the affected utility excavator either that the Department will refuse to disclose the protected information or, if there is no proper basis for such refusal, that the Department intends to disclose the requested information unless ordered otherwise by a court. **** (c) **Coordination.** (i) The Department shall review the five-year plans and identify conflicts and opportunities for coordination of excavations. The Department shall notify affected owners and permittees of such conflicts and opportunities to the extent necessary to maximize coordination of excavation. Each applicant shall coordinate, to the extent practicable, with each potentially affected owner and permittee to minimize disruption in the public right-of-way. (ii) When two or more applicants coordinate major work in the same block so that, in the opinion of the Department, such major work minimizes disruption to the affected neighborhood, and is likely to qualify the block for repaving, the Department shall make its best effort to schedule the affected block for repaving. Such scheduling shall occur, to the extent funds are available in the Street Damage Restoration Fund, so that the applicants may qualify for a waiver of the street damage restoration fee under Section 2.4.44(b)(ii). Notwithstanding the foregoing, nothing in this subsection shall interfere with the Department's authority to allocate available repaving resources in a manner that it determines best serves the public interest. (Added by Ord. 341-98, App. 11/13/98)" Order No. 171, 442, Regulations for Excavating and Restoring Streets in San Francisco, §2.4.11. (http://www.sfdpw.com/sfdpw/download/sccc_dpw_order.pdf, http://www.sfdpw.com/sfdpw/download/excacode.pdf)
California (San Joaquin)	"San Joaquin County, its major cities, and the city of Modesto convene regularly scheduled meetings between the city/county public works department and representatives from the engineering and planning departments of the electric, water, and gas utilities and telecommunications companies active within the

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	district. No proprietary information or confidential material is shared in these meetings, only public information on upcoming construction projects. Since this procedure is well entrenched in the districts, the meetings usually take less than one half-hour. The meetings enable the utilities and the public works department to coordinate projects. Benefits • Fewer customer interruptions with reduced number of street closings. • Lower construction costs by sharing expenses. • Less chance of inspection delays. (If the public works department is overseeing the entire project, the inspector is involved in the project from the beginning.) • Faster permit approval by creating a forum for questions prior to permit submittal. • Contact network of interested parties to ensure a smooth process from start to finish." Utility Coordination Meetings, San Joaquin Valley (California) Broad Band Task Force, 31//1/02. (http://www.connectedcommunities.net/Utility%20Meetings,%20San%20Joaquin%20Example%203%2002.pdf)
Colorado (Boulder)	"Prior to erection of any towers, poles, or conduits or the construction, upgrade or rebuild of a cable system authorized under this chapter, a franchisee shall first submit to the city and other designated parties for approval a concise description of the cable system proposed to be erected or installed, including engineering drawings, if required by the city, together with a map and plans indicating the proposed location of all such facilities . . . . A franchisee is expected to use, with the owner's permission, existing underground conduits or overhead utility facilities whenever feasible." Chapter 11.6-5 (12) B.R.C. 1981. (http://www.ci.boulder.co.us/clerk/previous/list/970827/13.html)
Colorado (Broomfield County)	"The permittee will make reasonable efforts to alert other similar providers of its intention to trench in the public rights-of-way and will attend and participate in meetings of the city, of which the permittee is made aware, regarding right-of-way issues that may impact its facilities, including planning meetings to anticipate joint trenching and boring. Whenever it is possible and reasonably practicable to joint trench or share bores or cuts, the permittee shall work with other providers, licensees, permittees, and franchisees so as to reduce so far as possible the number of right-of-way cuts within the city. Nothing herein shall require the permittee to enter into an agreement with such other entities if such an agreement would compromise the integrity of the permittee's facilities, unless the entity proposing to use the facilities agrees, at its expense, to make such modifications to the facilities as would prevent such compromise of integrity." Broomfield County, Colorado Code § 14-10-120(A). (http://www.ci.broomfield.co.us/code/_DATA/TITLE14/Chapter_14_10_Use_of_Public_Rights/14_10_120_General_rights_of_wa.html)
Colorado (Greenwood Village)	"Whenever it is possible and reasonably practicable to joint trench or share bores or cuts, a permittee shall meet and cooperate with other providers, licensees,

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	permittees, and franchisees so as to reduce so far as possible the number of street cuts within the city and the amount of pedestrian and vehicular traffic that is obstructed or impeded. Should two permittees refuse to joint trench or share bores or street cuts, the city may require each permittee to submit written evidence detailing why such joint trenching or sharing would be impossible or impractical. Such evidence may include the potential impact of joint trenching or sharing on the timing of the initiation and/or completion of the work. The city shall consider the evidence submitted. Should the permittee fail to provide evidence satisfactory to the city that joint trenching or sharing is impossible or impractical, the city may deny a permit on that basis." Greenwood Village, Colorado, Ord. 2001-29 § 1 (part), Title 12, Chapter 12.04.160. (http://www.greenwoodvillage.com/municode/_DATA/TITLE12/Chapter_12_04_PUBLIC_RIGHT_OF_WAY_/12_04_160_Joint_planning_and_c.html)
Connecticut	"The department shall authorize any certified telecommunications provider to install, maintain, operate, manage or control poles, wires, conduits or other fixtures under or over any public highway or street for the provision of telecommunications service authorized by section 16-247c, if such installation, maintenance, operation, management or control is in the public interest, which includes but is not limited to, facilitating the efficient development and deployment of an advanced telecommunications infrastructure, facilitating maximum network interoperability and interconnectivity, and encouraging shared use of existing facilities and cooperative development of new facilities where legally possible and technically and economically feasible." 12 CA 499, 504, § 16-247h. (http://www.cga.state.ct.us/2001/pub/Chap283.htm)
Delaware	"The construction of a six-lane temporary road on the west side of U.S. Route 202, the first part of the Blue Ball project, will be completed in either late Spring or early Summer, said Delaware Department of Transportation officials last week. Once completed, the temporary road will allow DelDOT to reconstruct Concord Pike (202) from the Augustine Cutoff to the Independence Mall, said William G. Stewart Jr., project engineer. Construction of West Park Road began in July 2002. . . . Utility work will be completed, which entails relocating all the existing utilities along 202 to a common trench called a 'utility corridor' that runs along West Park Road, Stewart said. The utilities are composed of city of Wilmington water, Verizon, Comcast, Cavalier, DELTRAC (DelDOT's traffic signal coordination for Rt. 202), Conectiv gas and electric." Community News, Antonio M. Prado, "Temporary road to replace 202 may be completed by Spring or Summer," February 14, 2003. (http://www.communitypub.com/CommArchives/02-14-03/pages/temporaryroadtore.html)
District of Columbia	"Good day Chairwoman Schwartz and Councilmembers. My name is Dan Tangherlini. I am the Acting Director of the District Division of Transportation of the Department of Public Works. It is a pleasure to be here today to testify on behalf of the Williams Administration's management of the rights-of- way that are

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	part of a very precious asset -- our streets. **** To establish some degree of control, Mayor Williams issued an order to stop all work in the public space. The two-week moratorium on public and private construction activities in the public space, issued on March 27, 2000, and extended to April 23, gave us--and the public--a chance to catch our breaths and devise a management plan for right of way activities. We have used the opportunity to develop rules and standards for right of way work, enhance inspector training and equipment and strengthen recordkeeping and internal administration. **** In addition, we are requiring the utilities to participate in the permit process by requiring that they pre-clear permits before they are submitted to the department. Before, DPW would try to insure that there were no conflicts between a proposed alignment and other utilities' infrastructure, taking considerable staff time and weeks or months to process. With pre-clearance, the utilities must perform this coordination amongst themselves. We also improved in-house coordination, cooperation and information. As required by the department, utilities recently submitted their two-year plans. These submissions reflect all planned major excavation work, show us where digging is going to take place and identify opportunities for joint trenching. The two-year plans along with a separate two-week submission, will provide us a better managed and coordinated street cut program." Testimony of Dan Tangherlini, Director, District Division of Transportation, Department of Public Works on Rights-of-Way Management Over Streets, July 5, 2002 (http://www.dcwatch.com/govern/dpw000605.htm)
District of Columbia	"The Williams administration recently instituted a comprehensive plan for the District's new 'Rights of Way' (ROW) program to manage the work of utility and telecommunications companies as they install fiber optic cables beneath the surface of city streets" which "calls for improved management of projects and coordination among firms that have permits to do work." The city is holding 200 street cuts "open past the 45-day requirement . . . because other utilities' cuts are imminent on these streets [and] [r]ather than repair them and tear them open again, the city wants to permanently repair them all at once." District of Columbia Department of Transportation (http://www.ddot.dc.gov/faqs/index3.shtm)
Florida (Cape Coral)	"The use of trenchless technology (i.e., directional bore method) for the installation of facilities in the Public Rights-of-Way as well as joint trenching and/or the co-location of facilities in existing conduit is strongly encouraged, and should be employed whenever feasible." City of Cape Coral, Florida, Telecommunications Ordinance (Or. 119-00, § 25-8(e), December 18, 2000). (http://www.capecoral.net/citydept/cityclrk/Code%20Ch.25-

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	Telecommunications.pdf)
Florida (City of Lake Mary)	"All Communications Facilities shall be placed or maintained so as not to unreasonably interfere with the use of the Public Rights-of-Way by the public and with the rights and convenience of property owners who adjoin any of the Public Rights-of-Way. The use of trenchless technology (i.e., directional bore method) for the installation of Facilities in the Public Rights-of-Way as well as joint trenching or the co-location of facilities in existing conduit is strongly encouraged and should be employed wherever feasible." City of Lake Mary, Florida, Ordinance No. 1053, Section 6(5). (http://www.lakemaryfl.com/Comm%20Ordinance1.pdf)
Florida (Key Biscayne)	"5. All Communications Facilities shall be placed and maintained so as not to interfere unreasonably with the use of the Public Rights-of-Way by the public and so as not to cause unreasonable interference with the rights and convenience of property owners who adjoin any of the Public Rights-of-Way. The Registrant shall endeavor to install all Communications Facilities underground. To the extent not inconsistent with Public Service Commission regulations, the Village may require the use of trenchless technology (i.e., directional bore method) for the installation of Facilities in the Public Rights-of-Way as well as joint trenching or the co-location of Facilities in existing conduit. In making such requests, the Village shall take into consideration several factors including inconvenience to the public and other users of Rights-of-Way and the economic and technical feasibility of such requests. The Registrant shall be liable for the displacement, damage or destruction of any property, irrigation system or landscaping as a result of the placement or maintenance of its Facility within the Public Rights-of-Way. The appropriate Village official may issue such rules and regulations concerning the placement or maintenance of a Communications Facility in Public Rights-of-Way as may be consistent with this Ordinance and other applicable law." Key Biscayne, Florida, Ordinance No. 2001-4, Article III, Section21-23(5). (http://vkb.key-biscayne.fl.us/clerk/ordinances/01-4.html)
Florida (Kissimmee)	"The use of trenchless technology (i.e., directional bore method) for the installation of facilities in the public rights-of-way as well as joint trenching and/or the co-location of facilities in existing conduit is strongly encouraged, and should be employed whenever possible." Kissimmee, Florida, Code of Ordinances, § 24-1-76(E). (http://www.amlegal.com/nxt/gateway.dll/Florida/Kissimmee/title00081.htm/chapter00082.htm?f=templates$fn=altmain-nf.htm$q=trenchless%20$x=Simple#LPHit1)
Florida (Miami)	"*Florida Power and Light Co.* (Miami, Florida) currently has three projects in Broward County and four projects in Dade County using joint trench. The joint-use service agreement dates back to 1997 with MasTec placing facilities for Florida Power and Light, Southern Bell Telephone Co. and local CATV companies. Work is predominately in new residential subdivisions. The trench profile consists of a ditch with power located with 36 inches (91 cm) cover, Southern Bell at 24 inches (61 cm) and the CATV facilities at 20 inches (51 cm) depth. The developers are positive, as project sites are excavated only once and in a timely manner."

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	Arthur R. McDonald, "Success in the Trenches," Transmission & Distribution World, December 1, 2001. (http://tdworld.com/ar/power_success_trenches/)
Florida (Palm Beach)	"All Facilities shall be placed or maintained so as not to unreasonably interfere with the use of Rights-of-Way by the public and with the rights and convenience of property owners who adjoin any of the Rights-of-Way. The use of trenchless technology . . . for the installation of Facilities in Rights-of-Way as well as joint trenching or the co-location of Facilities in existing conduit is strongly encouraged, and should be employed wherever feasible." Palm Beach County, Florida, Ordinance No. 2001-063, Section 5(1).
Florida (Pompano Beach)	"The city may require the use of trenchless technology (i.e., directional bore method) for the installation of facilities in the public rights-of-way, as well as joint trenching or the co-location of facilities in existing conduit." Pompano Beach, Florida, Code of Ordinances, § 100.48(D)(5). (http://www.amlegal.com/nxt/gateway.dll/Florida/Pompano%20Beach/title00025.htm/chapter00036.htm?f=templates$fn=altmain-nf.htm$q=trenchless$x=Simple#LPHit1)
Georgia (Atlanta)	"All grants or permissions given by the council by ordinance or resolution to any person to install multi-duct conduits of any kind in or upon the streets and public places of the city, for the purpose of having wires or other appliances, such as cables and the like, placed or strung therein to convey electric current, gas or steam to supply electric light, electric power or heat or for the use of telephones, telegraphs or television shall be subject to the right of the council to grant similar privileges and permits to other persons to use the same conduits for similar purposes, provided such additional use is practicable and capacity is available as determined in the discretion of the owner which shall not be unreasonably withheld. Persons using such conduits shall pay a reasonable value, as determined by agreement, to the owner. Such value shall be determined by agreement or condemnation subsequent to the grants or permits made by the council to the second applicant. All grants, permits and privileges made by the council for any of the purposes named in this section shall be subject to all the conditions of this section, and the applicant therefore binds the applicant thereto by accepting any of the grants or privileges." Atlanta City Code 1977, § 9-3123; Ord. No. 2001-22, § 3-14-01. (http://livepublish.municode.com/9/lpext.dll/Infobase60/1/5bba/5d1a/5d75/5d80?f=templates&fn=altmain-nf.htm&q=%22use%20the%20same%20conduits%22&x=Simple&2.0#LPHit1)
Georgia (Atlanta)	"*Georgia Power Co.* (Atlanta, Georgia, U.S.), in the Atlanta and West Georgia area, is coordinating with Bell South Co., AT&T Broadband and the developers of various subdivisions and apartment complexes to implement and use joint trench. The ditches are 42 inches (107 cm) deep and 12 inches (30 cm) wide and average about six cables and/or conduits in the ditch, excavated by one three-man crew using a combo trencher and/or backhoe." Arthur R. McDonald, "Success in the Trenches," Transmission & Distribution World, December 1, 2001.

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	(http://tdworld.com/ar/power_success_trenches/)
Hawaii (Palolo)	"A common trench will be used wherever possible" for the undergrounding of utilities. Palolo Neighborhood Board Meeting, July 10, 2002. (http://www.co.honolulu.hi.us/nco/nb6/02/6julmin.htm)
Indiana (Bloomington)	"Grantee may be required by City to share conduit and/or pole space owned and maintained by the Grantee, upon reasonable terms and conditions, with person(s) or corporation(s) . . ." Cable Franchise Agreement between the City of Bloomington, Indiana, and Insight Communications of Indiana, LLC § 13.6. (www.ci.bloomington.mn.us/code/Code20_8.html)
Kentucky (Versailles, Midway, and Woodford County)	"Telephone, cable and other underground services shall be located in a common trench and area within the right-of-way or easement of the alley." Versailles, Midway and Woodford County Subdivision and Site Plan Regulations, Section 1.2.08(D)4. (http://woodfordcountyplanningandzoning.com/documents/New%20Urban%20Development%20Subdivision%20and%20Site%20Plan%20Regs.pdf)
Kentucky (Lexington-Fayette)	"In order to minimize interference with the use of Rights-of-Way by others, each Party subject to this Ordinance will make reasonable efforts to minimize the number of Surface Cuts made, will make reasonable efforts to coordinate such Surface Cuts with the Government's paving schedule, and, if appropriate, enter into joint trenching and other arrangements with other Parties." Lexington-Fayette Urban County Government Public Right-of-Way Ordinance No. 166-2002, Section 17C-7(2)(C). (www.kyclerks.com/incl-forms/publicrightofwayord.doc)
Maryland (Emmitsburg)	"The developer shall coordinate the installation of other utilities, gas, telephone, electric, TV cable, to the extent that common trench installations may be used whenever possible. A preliminary plan shall be sent to each utility for their use in designing the plan for their buried facilities. Each utility shall submit a plan for installation of their utilities to the town for review and approval prior to beginning construction." Emmitsburg Municipal Code 16.20.020(J). (www.emmitsburg.net/towngov/regulations/title_16.20.htm)
Maryland (Gaithersburg)	"Grantee shall use, with the owner's permission, existing poles, conduits and other facilities whenever technically feasible and economically practical. Grantee may not erect poles, conduits or other facilities in Public Way without the express permission of the City, and/or necessary local permits. Copies of agreements for use of conduits or other facilities shall be filed with the City upon City request." Cable Franchise Agreement between City of Gaithersburg, Maryland, and Comcast, § 3.2.9. (www.ci.gaithersburg.md.us/Documents/042203_cable_tv.pdf)
Massachusetts	"A company desiring to construct a line for such transmission upon, along, under or across a public way shall in writing petition the board of aldermen of the city or the selectmen of the town where it is proposed to construct such line for permission to erect or construct upon, along, under or across said way the wires, poles, piers,

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	abutments or conduits necessary therefor. . . . After the erection or construction of such line, the board of aldermen or selectmen may, after giving the company or its agents an opportunity to be heard, or upon petition of the company without notice or hearing, by order permit an increase in the number of wires or cables, and direct an alteration in the location of the poles, piers, abutments or conduits or in the height of the wires or cables. The board of aldermen or selectmen may, on written petition by two or more companies subject to this chapter, and having locations in any of the public ways of such city or town, without notice or hearing, by order transfer any such location from one of such companies to either or any of the other petitioners, or by order authorize any such company to attach its wires and fixtures to existing poles, piers or abutments of either or any of the other petitioners, or to maintain its wires or cables in the conduits of either or any of said other petitioners, or by order grant to said companies joint or identical locations for the maintenance of said existing poles, piers, abutments or conduits, to be used in common by them. The board of aldermen or selectmen may, on written petition by a company subject to this chapter having a location, or by two or more such companies having joint or identical locations, in any of the public ways of a city or town, in any case where a private way has been accepted as a public way, by order, without notice or hearing, grant a location or joint or identical locations to such company or companies for the maintenance of its or their poles, piers, abutments or conduits which were being maintained in such private way at the time of its acceptance as a public way. The board of aldermen or selectmen may, on written petition by two or more companies subject to this chapter, and after notice to abutting land owners and a hearing as hereinbefore provided, by order grant to said companies joint or identical locations for the erection or construction of poles, piers, abutments or conduits, to be owned and used in common by them. No order of the board of aldermen or selectmen shall be required for renewing, repairing or replacing wires, cables, poles, piers, abutments, conduits or fixtures once erected or constructed under the provisions of law, or for making house connections or connections between duly located conduits and distributing poles." Massachusetts General Laws, Chapter 166, Section 22. (http://www.state.ma.us/legis/laws/mgl/166-22.htm)
Massachusetts (Boston)	The Public Improvement Commission ("PIC") of the City of Boston Policy Relating to Grants of Location for New Conduit Networks for the Provision of Commercial Telecommunications Services provides that a carrier that wants to install new conduit must, *inter alia*, notify all companies on file with the PIC about the specifics of the proposed construction, invite and negotiate with other firms that want to participate in construction, and submit a coordinated plan to the PIC. The PIC will not approve grants of location until it is satisfied that all interested firms have had an opportunity to share their conduit in the requested locations and have executed necessary agreements. *See* Policy at ¶¶ 8-9 (www.cityofboston.gov/coo/otcpolicy.asp)
Massachusetts (Cambridge)	"3.2 To minimize disruption and to conserve and safeguard scarce conduit area, the P&C Commission will ordinarily authorize only one new street opening and a single common trench for underground Telecommunications Services in each

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	public way and public right-of-way in the City. 7.2 The Applicant or Lead Company shall enter into good faith negotiations with interested companies, institutions, and entities for joint construction, cost sharing, and joint conduit use. All interested companies ("Participants") shall work with the Lead Company to submit a single, revised, and coordinated Application to the P&C Commission." Cambridge License Commission Pole and Conduit Siting Policy Relating to Grants of Location for Telecommunications Services Networks, Sections 3.2 and 7.2. (www.cambridgema.gov/~License/pandc.html)
Minnesota	"Subp. 11. **High-density corridor.** 'High-density corridor' means a designated portion of the public right-of-way within which telecommunications right-of-way users having multiple and competing facilities may be required to build and install facilities in a common conduit system or other common structure." Minnesota Rules, Chapter 789.0100, Subp. 11 (http://www.revisor.leg.state.mn.us/arule/7819/0100.html)
Minnesota	"Utilities can often share the same trench . . . . A common utility trench within the same easement may be cost effective, reduce the size of area disturbed, and save trees. . . . One of the few exceptions to joint utility trenches is that water and sewer utilities may be required to be in separate trenches. Other utilities, including electric, gas, fiber optic, and cable television, can be installed in the same trench. The North Oaks development in Minnesota has been using a joint utility trench." Minnesota Department of Natural Resources, et al., "Conserving Wooded Areas in Developing Communities: Minnesota Best Management Practices," p. 69 (2000). (http://files.dnr.state.mn.us/forestry/urban/bmps_chapter5.pdf)
Minnesota (Golden Valley)	"T. 'High Density Corridor' means a designated portion of the public right-of-way within which right-of-way users have multiple and competing facilities may be required to build and install facilities in a common conduit system or other common structure." Golden Vally, Minnesota, City Code, Section 7.02 – Definitions. (http://www.ci.golden-valley.mn.us/citycode1/chapter7text.htm)
Minnesota (Hennepin County)	"**High Density Corridor:** Means a designated portion of the public right-of-way within which telecommunications right-of-way users having multiple and competing facilities may be required to build and install facilities in a common conduit system or other common structure." Hennepin County, Minnesota, Ordinance No. 22: County Road Right-of-Way Use (http://www.co.hennepin.mn.us/ords/ord22/ordinance22.htm)
Minnesota (Hopkins)	"Subd. 22. 'High Density Corridor' means a designated portion of the public right-of-way within which telecommunications right-of-way users having multiple facilities may be required to build and install facilities in a common conduit system or other common structure." "805.41. Location and Relocation of Facilities. Subd. 1. Location and Relocation. Right-of-way users shall comply with the facilities placement, location, and relocation requirements and provisions of the Act, other applicable law, and with Minnesota Rules 7819.3100, 7819.5000 and

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	7819.5100. In addition, right-of-way users shall place all facilities underground in locations where the city requires all other right-of-way users providing the same type of service to do the same. In those areas of the city where right-of-way users facilities are located on above-ground transmission or distribution facilities of a public utility or other telecommunications provider, right-of-way users shall relocate or reinstall their facilities underground, at such user's own cost, within 120 days of written request from the city when: a. the utility on whose above-ground transmission facilities the right-of-way user has attached its facilities is required to relocate such utilities facilities underground; or b. the city requires all right-of-way users to relocate aboveground facilities underground within a designated right-of-way area Unless excavation or disturbance is unavoidable, permittees shall not excavate or disturb public streets, roads or sidewalks that have been constructed by the city within five (5) years prior to installation of any facilities but shall, instead, use installation and construction techniques, such as directional boring, that require the least possible excavation or disturbance of public streets, roads or sidewalks. Subd. 2. Corridors. The city may assign specific areas within the right-of-way, or any particular segment thereof for locating each type of facilities. If applicable, all permits issued by the city involving the installation or replacement of facilities shall designate the proper corridor for the facilities at issue. Any registrant who has facilities in the right-of-way in a position at variance with the corridors established by the city shall, no later than at the time of the next reconstruction or excavation of the area where the facilities are located, move the facilities to the assigned position within the right-of-way, unless this requirement is waived by the city for good cause shown, upon consideration of such factors as the remaining economic life of the facilities, public safety, customer service needs and hardship to the registrant. Subd. 3. Limitation of Space. To protect health, safety, and welfare or when necessary to protect the right-of-way and its current use, the city shall have the power to prohibit or limit the placement of new or additional facilities within the right-of-way. In making such decisions, the city shall strive to the extent possible to accommodate all existing and potential right-of-way users, but shall be guided primarily by considerations of the public interest, the public's needs for the particular Utility Service, the condition of the right-of-way, the time of year with respect to essential utilities, the protection of existing facilities in the right-of-way, and future city plans for public improvements and development projects which have been determined to be in the public interest." Hopkins, Minnesota, Ordinances & Policies, Chapter VIII – Streets, Alleys & Public Grounds, § 805.05, Subd. 22; § 805.41. (http://www.hopkinsmn.com/cityhall/ordpol/08/805.html)
Minnesota (Lino Lakes)	"A joint trench requirement for utilities has been added" to Ordinance No. 04-03, Adopting Subdivision Regulations. "This has been the City's practice, but it has not been formally adopted by ordinance." (1007.10), Council Minutes of the City

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	of Lino Lakes, dated January 27, 2003. (http://www.ci.lino-lakes.mn.us/COUNCIL2/2003minutes/01-27-~1.doc)
Minnesota (Ramsey County)	"High Density Corridor" means a designated portion of the public right of way within which telecommunications right of way users having multiple and competing facilities may be required to build and install facilities in a common conduit system or other common structure." Ramsey County, Minnesota, Right-of-Way Ordinance. (www.co.ramsey.mn.us/cb/ordinances/ Public%20Works%20Right-of-Way%20Ordinance%2001-287.doc)
Minnesota (Richfield)	"Subd. 21. High Density Corridor. "High Density Corridor" means a designated portion of the public right-of-way within which telecommunications right-of-way users having multiple and competing facilities may be required to build and install facilities in a common conduit system or other common structure." "Subd. 5. Retirement of Overhead Facilities. The city council may determine whether it is in the public interest that all Facilities within the city, or Facilities within certain districts designated by the city, be permanently placed and maintained underground by a date certain or target date, independently of undergrounding required pursuant to Section 802.47, Subd. 2. of this Code (new Facilities) and subdivision 802.47, Subd. 3. (Replacement Facilities). The decision to underground must be preceded by a public hearing, after published notice and written notice to the utilities affected. (Two weeks published: 30 days written.) At the hearing the council must consider items (1) – (4) in Section 802.47, Subd. 5.B. of this Section and make findings. Undergrounding may not take place until city council has, after hearing and notice, adopted a plan containing items (1) – (6) of Section 802.47, Subd. 5.C. of this Section." "802.49 Location and Relocation of Facilities. Subdivision 1. Rule. Placement, location, and relocation of facilities must comply with the Act, with other applicable law, and with Minnesota Rules 7819.3100, 7819.5000 and 7819.5100, to the extent the rules do not limit authority otherwise available to cities. (a) Relocation Notification Procedure: The Director shall notify the utility owner at least three months in advance of the need to relocate existing facilities so the owner can determine if relocation or replacement is required and plan any required work. The Director shall provide a second notification to the owner one month before the owner needs to begin the relocation. The utility owner shall begin relocation of the facilities within one month of the second notification. To the extent technically feasible, all utilities shall be relocated within one month or in a time frame determined by the Director. The Director may allow a different schedule if it does not interfere with the city's project. The utility owner shall diligently work to relocate the facilities within the above schedule. **** (c) Joint Trenching: All Facilities shall be placed in appropriate portions of right-of-way so as to cause minimum conflict with other underground Facilities. When technically appropriate and no safety hazards are created, all utilities shall be

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	installed, constructed or placed within the same trench. Notwithstanding the foregoing, gas and electric lines shall be placed in conformance with Minnesota Rules pt. 7819.5100, subd. 2, governing safety standards." Richfield, Minnesota, City Code, Chapter VIII: Streets, Alleys, and Public Grounds. (http://www.ci.richfield.mn.us/HomeBusiness/CityCodes/CityCodesPDF_Files/ch08.pdf)
Minnesota (Washington County)	"'High Density Corridor' means a designated portion of the public right-of-way within which telecommunications right of way users having multiple and competing facilities may be required to build and install facilities in a common conduit system or other common structure." Washington County, Minnesota, Right of Way Ordinance for the Management of Utilities in the Public Right of Way. (http://www.co.washington.mn.us/ordinances/ordn0154.pdf)
Missouri (Kansas City)	"I. JOINT INSTALLATION AND EXCESS CONDUIT POLICY In order to minimize entry into the city's rights-of-way and to minimize disruption to city facilities, the facilities others using the rights-of-way, and to the citizens of the city, the city has adopted the following policy related to notification of right-of-way use, joint construction of underground facilities and installation of excess conduit. 1.01 Joint Installation Notification. A. Prior to constructing any new or additional underground conduit or above ground boxes or pedestals within the Rights-of-Way, a Franchisee shall certify in writing to the City Engineer that it has made appropriate inquiry to all existing utilities and other entities possessing a right to occupy the Rights-of-Way as to the availability of existing or planned conduit or box or pedestal locations that the Franchisee could reasonably utilize to meet its needs, and that no such conduit or box or pedestal locations are available or planned within the next six months. B. All existing utilities, and entities granted a Franchise, with usable conduit within the Rights-of-Way shall make such conduit available to other Franchisees consistent with the federal requirements of § 47 U.S.C. 224. All existing utilities, and entities granted a Franchise, with box and pedestal locations shall, when feasible, accommodate collocation of facilities of other Franchisees. Each Franchisee shall provide mapping of all existing facilities and excess conduit except as may be waived by the city engineer as unnecessary or unduly burdensome. All new facilities shall require sufficient mapping in hard copy and electronic format. C. Once the city engineer has made the determination that no such conduit or box or pedestal locations are available and has reviewed the plans and provided preliminary approval of the location of the facilities the city will notify by registered mail all companies on file with the city prior to being authorized to proceed with installation of new conduit or boxes and pedestals (or overhead facilities if otherwise permitted)." Kansas City (MO) Regional Telecommunications Consortium Model Joint

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	Installation and Excess Conduit Policy, § 1.01. (http://www.marc.org/telecom/Joint%20Installation%20and%20Excess%20Conduit%20Policy%2011.22.00.doc)
Missouri (St. Joseph)	"(d) All construction or maintenance of Facilities shall be accomplished in the manner resulting in the least amount of damage and disruption of the Public Right-of-Way. Specifically, every Applicant shall utilize Trenchless Technology and specify the use of Trenchless Technology in the design of projects located below or under pavements or other locations that will require cutting or patching of Public Right-of-Way. If and when the City requires a Public Utility Right-of-Way User to cease using existing poles, all other Public Utility Right-of-Way Users utilizing the same poles shall also relocate their Facilities underground at the same time. The cost of such relocations shall be borne in accordance with this Article and approved applicable tariffs governing that Public Utility Right-of-Way User. The design of each project shall be the design that will result in the least amount of disruptions to the Public Right-of-Way." City of St. Joseph, Missouri, Public Utility Right-of-Way Management Ordinance, § 29-356(d). (www.ci.st-joseph.mo.us/publicworks/right-of-way.pdf)
Missouri (St. Louis)	"Whenever the plans, as approved by the board of public service, require two or more applicants for conduits to use a common trench, space or conduit in any portion of any street, alley or public place all such applicants shall carry on the work of construction in such portion as nearly as practicable at the same time and as directed by the board, so as to disturb the street, alley or public place to the least degree possible. Any person refusing or failing to do so shall be deemed to have waived any right to any conduit privilege in such portion." St. Louis Revised Code, 23.42.170. (www.slpl.lib.mo.us/cco/code/data/t2342.htm)
Nebraska (Lincoln)	"All Grantees are required to cooperate with the City and with each other as follows: (a) By December 1 of each year, each Grantee shall provide the Director of Public Works and Utilities with a schedule of its proposed major construction activities which may affect the right-of-way for the next year. (b) The City shall prepare a one-year repaving plan indicating proposed right-of-way reconstruction, repaving and resurfacing. Such plan shall be updated annually, after receipt of the construction plans of the various Grantees. (c) Each Grantee shall meet with the City, other Grantees and users of the right-of-way annually or as determined by the City to schedule and coordinate construction. (d) All construction locations, activities and schedules shall be coordinated, as ordered by the Director of Public Works and Utilities, to minimize public inconvenience, disruption or damages. (e) Whenever two or more Grantees propose major excavations in the same area within any one year period, the City may require that they jointly excavate to minimize continual disruption to the right-of-way." Lincoln, Nebraska, Ord. 17559 § 32; November 13, 2000, Chapter 5.17, Section 5.17.320.

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	(http://www.ci.lincoln.ne.us/city/attorn/lmc/ti05/ch517.pdf)
Nevada	"Whenever practical, a telephone company's extension of its facilities to and within a development must be installed in trenches used jointly with facilities of other public utilities." Nevada NAC 704A-490. (http://www.leg.state.nv.us/NAC/NAC-704A.html)
Nevada (Clark County)	"With regard to plant mix and structure sharing, the Commission is persuaded by the arguments offered by the Intervenors that Sprint's position on structure sharing for feeder plant is inconsistent, given Clark County's desire to minimize street cuts and Sprint's obligation to provide nondiscriminatory access to poles, ducts, conduit and rights of way, as mandated under Section 251 of the Telecommunications Act. The Commission agrees with the Intervenors that it is unreasonable to assume, given these two directives, that there will be no sharing of underground ducts and conduit on a forward-looking basis, which is a reasonable assumption of how a business would respond to such a local ordinance." Modified Final Order, Docket No. 98-6005, In re filing of Sprint of Nevada's UNE Cost Study, July 1, 1999, ¶ 20.
New York	"To the extent practicable, underground electric, communication and CATV facilities shall be installed in a common trench when new construction is, or can without undue difficulty, be made simultaneously. Every reasonable effort should be made to use joint occupancy utility poles to accommodate the installation of electric, communication and CATV facilities when new overhead construction occurs." Orange and Rockland Utilities Inc., General Information: How to Obtain Service, issued December 15, 1995, Original Leaf No. 8C. (http://www.oru.com/documents/tariffsandregulatorydocuments/ny/electrictariff/electricGI03.pdf)
North Carolina	"Several joint trench projects going on – widely embraced by developing communities." NCUCC Meeting Minutes, March 13, 2001, Charlotte, NC. (http://www2.ncocc.org/ncocc/default.htm)
North Carolina (Charlotte)	"*Duke Engineering and Services* (Charlotte, North Carolina, U.S.) is coordinating the placement of joint-use facilities for Duke Power Co., BellSouth Co., Alltel, CTC (Concord Telephone Co.), TimeWarner, Carolina Broadband and Piedmont Natural Gas Co. The shared trench is currently excavated using combined trenching methods with a trench 54 inches (137 cm) in depth. A typical configuration is primary and secondary power, trunk and service cables for one or more communication companies, and multiple cables or inner ducts (as many as six) for CATV. Presently, the work is in the Charlotte area; however, the program is so successful it soon will spread to all areas served by Duke Power Co." Arthur R. McDonald, "Success in the Trenches," Transmission & Distribution World, December 1, 2001. (http://tdworld.com/ar/power_success_trenches/)
North Carolina	"E. Use of poles. A grantee shall not erect, authorize or permit others to erect any

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(Henderson County)	poles or facilities within the streets, highways or public rights-of-way within the county for the conduct of its CATV system but shall use the existing poles and other equipment of the appropriate electrical power and telephone and other utility companies under such terms and agreements as the grantee negotiates with these companies; provided, however that when the grantee is unable to reach mutually satisfactory arrangements with appropriate electrical power and telephone and other utility companies, or where the facilities are not available, the grantee may locate its poles or facilities within the streets, highways or public rights-of-way within the county or to the extent that the county has such right-of-way and appropriate approval is obtained . . . . F. Coordination. The grantee shall maintain membership in North Carolina One Call Center, Inc. to assure coordination with all member utilities." Code of Henderson County, North Carolina Chapter 74-10(E), (F). (http://gcp.esub.net/cgi-bin/om_isapi.dll?clientID=147452&infobase=hendersn.nfo&softpage=Browse_Frame_Pg42)
North Carolina (Raleigh)	"*Public Service Co. of North Carolina* (PSNC) and *Progress Energy Co.* (Raleigh, North Carolina, U.S.). MasTec is currently working on a joint-trench project, Heritage of Wake Forest, installing four utilities: gas, electric, telephone and CATV. This is a 3000- to 5000-lot subdivision, with three schools and several business parks. There will be a 10-year build-out on this project. MasTec also will be installing service to several Wake County schools in the near future. This will include several miles of 4-inch (10-cm) plastic gas mains and the installation of services to the facilities. MasTec has finalized a 400-lot subdivision scheduled for July completion in northern Wake County and is pursuing another in Durham County." Arthur R. McDonald, "Success in the Trenches," Transmission & Distribution World, December 1, 2001. (http://tdworld.com/ar/power_success_trenches/)
Oklahoma (Stillwater)	"Prior to beginning any construction, Grantee shall provide Grantor with a construction schedule for work in the Streets. All construction shall be performed in compliance with this Agreement and all applicable City Ordinances and Codes. When obtaining a permit, Grantee shall inquire in writing about other construction currently in progress, planned or proposed, in order to investigate thoroughly all opportunities for joint trenching or boring. Whenever it is possible and reasonably practicable to joint trench or share bores or cuts, Grantee shall work with other providers, licensees, permittees and franchisees so as to reduce as far as possible the number of Street cuts." Ordinance No. 2662, "An Ordinance Relating to Cable Television Adopting the Permit Agreement between the City of Stillwater and Peak Cablevision," § 9.1(B). (http://www.stillwater.org/cc100499/ord2662.htm)
Oregon (Lane County)	"Mike Pattle (Lane County) believes there is the opportunity for and encouraged all utilities to use joint trench on the LTD project in Springfield. Now would be the

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	time to get in on joint trench there. If anyone has questions on how to do that, contact Mike Pattle at 682-6933." Lane Utility Coordinating Council, Meeting Minutes, October 2, 2003 (http://www.luccdig.org/newsissue.cfm?ID=55)
Oregon	"With continued growth in population and industry in Oregon, a greater degree of cooperation, standardization and coordination of underground utilities must be obtained so utility installations are done at maximum efficiency, minimum cost and least environmental impact. Joint trenching has become a very viable means of installing utilities to maximize trench efficiency and minimize cost when the area for trenching is at a minimum or the type of soil (rock) is at a premium cost to excavate." Oregon Utilities Coordinating Council website (http://www.oucc.net/oucc_joint_trench.htm)
Oregon (Eugene)	"Councilor Nathanson requested an update on undergrounding of existing overhead utilities and budget issues related to undergrounding. In 1997, City Code was amended to require that all utilities for new development be under-grounded and that all utilities install conduit crossings with City "capacity enhancement projects" which would allow future undergrounding to occur. In addition, EWEB [Eugene Water and Electric Board] and the City signed a Memorandum of Understanding (MOU) in 1999 that committed EWEB to underground their facilities in certain situations when relocation was necessary due to a City street project. The MOU also committed EWEB to consider undergrounding certain facilities, with cost sharing from the City, which are considered "high risk" from a health/safety standpoint, as funding allows. To underground all existing City overhead traffic signal and illumination lines would cost $17 million, and to underground all existing overhead EWEB lines would cost $796 million, plus $1000 - 3000 per overhead service line. In the last two years, EWEB has under- grounded their existing overhead distribution lines on Ayres Road and Adams Street, and are planning a project on Coburg Road (I-105 to Oakmont)to be built in the next year or so. The total cost of these three projects to EWEB is about $640,000. Including other undergrounding EWEB has performed, a total of 12.7 miles of electric facilities have been undergrounded since 1999. While EWEB continues to install overhead facilities in rural areas, their overall total of overhead facilities has decreased by 2.2 miles since 1999. Normally, cable TV, and other overhead utilities that are co-located on EWEB poles, "joint trench" underground with EWEB electric." City of Eugene Public Works, March 2002 Report (http://www.ci.eugene.or.us/PW/department/Reports/Mar2002.htm)
Oregon (Eugene)	"A provider planning to install a new facility or perform a major facility upgrade, within the public way under a standard right-of-way cut permit, greater than 400 linear feet, shall provide notice to the City and all other utilities and license holders. . . who are licensed or franchised to provide services within the project area. The purpose of this notification is to encourage collocation of facilities and minimize impacts on the public way. The notice is intended to provide other utilities and license holders an opportunity to install facilities in a joint trench or to

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	coordinate work along the same street segment while not unduly interfering with the provision of services to the originating provider's customers." Administrative Order No. 58-97-21-F of the City Manager of the City of Eugene, R-7.302-C(2). (http://www.ci.eugene.or.us/TELECOM/Ordinances/CEAO58_97_21_F.htm)
Oregon (Prineville District)	"The power, cable and telephone ROWs will be installed in a common trench underground between Highway 97 and the resort." Decision Record, EA Number OR-056-02-006, Huntington Ranch LLC (granting 7 ROWs within 3 ROW corridors across Bureau of Land Management managed lands to Huntington Ranch LLC). (http://www.or.blm.gov/Prineville/planning/Decision_Records/dr_02_006r.pdf)
Pennsylvania	"The Commission believes that there should be joint use of trenches whenever economically and technologically feasible. However, the Commission realizes that the economic advantages which can result from the joint use of trenches may at times be obviated by the technological disadvantages of joint occupancy. Therefore, the Commission will not make the joint use of trenches mandatory but will require the joint use of trenches whenever the circumstances indicate that the use would be feasible and parties agree thereto." Pennsylvania Code § 63-41(e). (http://www.pacode.com/secure/data/052/chapter63/s63.41.html)
Pennsylvania (Pittsburgh)	"Franchisee shall utilize existing poles and conduit where possible. Franchisee shall enter into pole attachment agreements with utilities maintaining poles in the Franchise Area in compliance with applicable law." Pittsburgh Cable Agreement, Section 9.13. (www.city.pittsburgh.pa.us/cable/sections_9-12.html)
South Carolina (Columbia)	"*South Carolina Electric and Gas Co.* (Columbia, South Carolina, U.S.) and Time Warner CATV Co. completed a joint-trench agreement in March 2001, with completion of the first phase in May 2001. The project was accomplished using a five-man crew and was coordinated by South Carolina Electric and Gas Co. The job consisted of laying power cables and CATV in the bottom of a 48-inch (122-cm) backhoed ditch, putting a 12-inch (30-cm) separation between those cables and a 2-inch (5-cm) gas main. Also, a tracer wire and marking tape were installed for the gas pipe. The crew averaged about 1500 ft (457 m) per week. They also set and made up transformers, set streetlight poles and stubbed for CATV boxes." Arthur R. McDonald, "Success in the Trenches," Transmission & Distribution World, December 1, 2001. (http://tdworld.com/ar/power_success_trenches/)
Tennessee (Collierville)	"A franchisee shall install its telecommunications facilities within an existing underground duct or conduit whenever excess capacity exists." Collierville, Tennessee, Code of Ordinances, § 117.060(A). (www.amlegal.com)
Texas	"San Antonio's franchise agreements with Southwestern Bell, MCI, Brooks Fiber and ICG . . . also provide for a utility coordination program to minimize street cuts . . . ." Texas House of Representatives, House Research Organization, Interim News,

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	November 10, 1997.
Texas (Cibolo)	"I. Discussion/Action on Approval/Disapproval of request from Time Warner Communications to open cut Cibolo Vally Drive in Willowbridge Subdivision to install conduit. Keith Gilbreath stated that this would be a joint trench with Southwestern Bell and Time Warner and would take about ½ to 1 day to complete. EMS, Schools and Public Safety would be notified for emergencies. Would be done before the resurfacing of the road. Council O'Brien made the motion to approve the request from Time Warner Communication to open cut Cibolo Valley Drive in Willowbridge Subdivision to install conduit contingent upon all work is complete before the final overlay of street. Seconded by Councilwoman Duggar. For: All, Against: None." Cibolo, Texas, Regular City Council Meeting Minutes, May 28, 2002 (http://cibolo.home.texas.net/052702.htm)
Texas (Dallas)	• Old pavement cut and repair code was inadequate to handle the increase in activity and number of users generated by the deregulation of the telecommunication industry – Contained very broad language – Pavement repair not detailed – Limited enforcement capability • Need existed for a comprehensive right-of-way management ordinance **** Program Status • Program Resources – Utility Coordination • Utility Coordinator • Clerk – Cut Control inspection group • Cut Control Supervisor (Retired 1/03, not filled) • 8 Inspectors (2 retired this FY, not filled) • Cut Control clerk – Computer Permit System **** • Continuing meetings with Utilities – Routine monthly meeting • To coordinate utility relocation in advance of construction • Attended by utility company reps, city's project managers, and Utility Coordinator **** Positive Results **** • Joint trenches – minimizes pavement cuts necessary. Decreases disruption caused by multiple projects in one location. There were 6 joint trench projects

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	in the second year. Dallas, Texas, "Street Cut Standards and Implementation: Year Two Update (August 11, 2003) (http://www.dallascityhall.com/dallas/eng/council_briefings/briefings/20030811_street_cut_standards.pdf)
Texas (Dallas)	"The director may require the permittee to share trench space to minimize the disruption of vehicular and pedestrian traffic or to provide space for needed city facility installations if such sharing is: (A) technically, commercially, and economically feasible; and (B) not in violation of state or federal regulations or industry safety standards." Dallas City Code, Section 43-139(c)(17). (http://www.amlegal.com/nxt/gateway.dll?f=templates&fn=default.htm&vid=alp:dallas_tx)
Texas (Fort Worth, Irving)	"If several utilities are expanding through the same right-of-way corridor, a very effective manner to reduce the impact and provide cost savings for all is the use of joint trenching for the common route. Joint system use depends on cooperation among private utility owners as much or more than cooperation with the local government. Fort Worth reports trenches with six or seven companies in one trench, while Irving reports trenches with eight or nine companies in one trench. Several manholes along a route were the compromise made for this arrangement." Public Right-of-Way Management: Suggestions for Local Governments – North Central Texas," by the Right-of-Way Management Guidelines Oversight Team and Public Works Council of the North Central Texas Council of Governments, February 2003. (http://publicworks.dfwinfo.com/ROW/PDFs/Right_of_Way_Management.pdf)
Texas (Houston)	**"Sec. 40-144. Owner business plans; coordination of excavations.** (a) On or before June 1 of each year, owners shall submit a plan of excavations anticipated to be done in the public way during the five year period commencing on July 1 of that year. Additionally, the city engineer shall annually solicit a five year transportation improvement plan from the various public way construction entities. As soon as practicable following receipt and compilation of the plans, the city engineer shall make available for inspection a composite list of all projects and transportation improvements designated in the various plans. The director shall endeavor to cause the composite list to be maintained in the form of a computerized database, which may be maintained by the city or another public entity. Applicants are responsible for keeping themselves apprised of the current status of the list. An owner or public way construction entity may change, add, or delete any project in its five year business plan, and if any modification is made, the owner and/or public way construction entity shall notify the city engineer. (b) Prior to issuance of a permit, the city engineer shall check the application against the composite list. The city engineer may require owners to (i) coordinate their excavations; (ii) coordinate excavations with transportation improvements that are ongoing or are scheduled by public way construction entities; and (iii) complete excavations before transportation improvements commence. The city

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	engineer may grant a waiver of coordination requirements for good cause. The city engineer shall consider the following before granting a waiver: (1) Effect of each proposed excavation(s) on the surrounding vicinity and on traffic mobility; (2) The applicant's need for the facility; (3) The need to facilitate the deployment of new technology as directed pursuant to official city policy; and (4) Public health, safety, welfare, and convenience. **Sec. 40-145. Newly constructed or reconstructed streets.** (a) Except as provided in subsection (b) below, no permit shall be issued for an excavation in any public way that has been constructed, reconstructed, repaved, or resurfaced in the preceding period of five years, as measured from the date of acceptance by the public works construction entity. Owners shall determine alternative methods of making necessary repairs and facility installations to avoid excavations that are subject to this section." City of Houston, Texas, Ordinance No. 2000-1115 (http://www.ci.houston.tx.us/pwe/streetcut-pdf/streetcut-adopt.pdf)
Texas (Longview)	"Grantee shall cooperate in the planning, locating and construction of its cable system in utility joint trenches or common duct banks with other telecommunications providers. The city will provide advance notice to any grantee when it plans to open a trench and each grantee shall provide notice to the city when it plans to open a trench. The grantee and the city will offer to make space available to the other, and to other persons who participate in joint trenching, on reasonable terms and conditions." Longview, Texas, Code of Ordinances, Section 95-6(e). (http://www.amlegal.com/nxt/gateway.dll?f=templates&fn=default.htm&vid=alp:longview_tx)
Utah	"(4) The Department may consider financial and technical qualifications of telecommunication facility providers, and specify insurance requirements for contractors authorized to enter Interstate System rights-of-way to construct, install, inspect, test, maintain or repair Telecommunication Facilities with longitudinal access or wireless access. During each period that the Department authorizes longitudinal access or wireless access for construction and installation, the Department may require approved Telecommunication Facility Providers to install Telecommunication Facilities into the same general location on the Interstate System; coordinate their planning and work; install in a joint trench; and equitably share costs." Utah Administrative Code R907-64-5(4). (http://www.code-co.com/utah/admin/2000/r907064.htm)
Vermont	"The Utility, the telephone company, and cable television shall utilize a common trench for installation of their cables, where possible." Vermont Utilities Electric Service Requirements Manual, § 511(E). (www.state.vt.us/psb/rules/3700rev2001.pdf)
Virginia	Dominion Power awards Team Fishel a 3-year contract in Virginia with two 1-year extensions for a joint trench project with Comcast and Verizon.

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	Vol. 16, No. 2, www.teamfishel.com, September 2003. (http://www.teamfishel.com/_DOWNLOADS/pdfs/DominionPower.pdf)
Virginia (Frederick County)	"To the extent possible, the franchisee shall negotiate agreements with the appropriate parties to permit it to use the existing poles and underground conduits throughout the County." Code of Frederick County, Virginia § 61.9. (http://gcp.esub.net/cgi-bin/om_isapi.dll?clientID=148590&infobase=frederic.nfo&softpage=Browse_Frame_Pg42)
Virginia (Vienna)	"(a) A Grantee shall utilize existing poles, conduits and other facilities whenever possible, and shall not construct or install any new, different, or additional poles, conduits or other facilities whether on public property or on privately-owned property until approval of the property owner or appropriate governmental authority is obtained. Approval of the Town shall not be unreasonably withheld. However, no location of any pole or wire-holding structure of a Grantee shall be a vested interest; and such poles, structures, or facilities shall be removed, replaced or modified by a Grantee at its own expense whenever the Council or other governmental authority determines that the public convenience would be enhanced thereby." Vienna, Virginia, Cable Communications, Chapter 24, § 24-29(a): Street Occupancy (http://www.ci.vienna.va.us/Town_Departments/CHAPTER24.pdf)
Washington (Lacey)	"**B. Physical Location of Facilities.** Unless otherwise required in current or future City ordinances regarding underground construction requirements, all facilities shall be constructed, installed and located in accordance with hierarchy of the following terms and conditions: 1. Telecommunications and Cable Facilities shall be installed within an existing underground duct or conduit whenever excess capacity exists within such utility facility and permission can be obtained reasonably from the installer of such duct or conduit. 2. Whenever one or more existing Telephone, Electric Utilities, Cable Systems or Telecommunications Facilities are located underground within rights of way, a licensee or franchisee shall occupy the same trench where reasonable and practical. 3. When sufficient capacity is not available under 1 or 2 above, the Telecommunications or Cable Facility shall be installed underground within the rights of way below the sidewalk or within the planter strip. 4. A franchisee or licensee with written authorization to install overhead facilities shall install its Telecommunications or Cable Facilities on pole attachments to existing utility poles only, and then only if surplus space is available." Lacey, Washington, Ordinance No. 1114, § 5.60.100(B). (http://www.mrsc.org/ords/l32o1114.aspx)
Washington (Olympia)	"B. Requirements 1. Any public or private utility owning, operating, or installing facilities in City streets, alleys, sidewalks, or any other public places that provide water, sewer, gas,

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	electric, communication, video, or other utility service, shall prepare and submit to the Public Works Director a utility master plan, in a format specified by the Director, that shows the location of the utility's existing facilities in City streets, alleys, sidewalks, and other public places, and shows all of the utility's planned major utility work in City streets, alleys, sidewalks, and other public places. Utilities shall submit an initial utility master plan no later than 180 days after the effective date of the ordinance adopting this section. Thereafter, each utility shall submit semi-annually, on the first regular business day of January and July, a revised and updated utility master plan. **** 5. Prior to applying for an excavation permit, any person planning to excavate in the City's streets, alleys, sidewalks or other public places shall review the utility master plans and the City's two-year repaving plan on file with the Director and shall coordinate, to the extent practicable, with the utility and street work shown on such plans to minimize damage to, and avoid undue disruption and interference with the public use of such streets, alleys, sidewalks or other public places. 6. Each utility will look for opportunities to combine projects and share trenches. The utilities will provide a reasonable assurance that other utilities have been contacted and given an opportunity to participate in the project." Olympia, Washington, Development Guidelines and Public Works Standards, Section 4B.195. (http://www.ci.olympia.wa.us/CPD/engineering/Development%20Guidelines%20and%20Public%20Works%20Standards%20CD/Chapter%20Sections/chapter%204%20index.pdf)
Washington (Pierce County)	"**12.34.725 Location of Facilities**. Unless otherwise specified in a franchise, restricted franchise, or cable franchise, all facilities shall be constructed, installed and located in accordance with the following terms and conditions: A. Telecommunications Facilities shall be installed within an existing County owned underground duct or conduit whenever Excess Capacity exists. Otherwise, installation of Telecommunication Facilities shall be done using methods consistent with the standards, codes, and regulations applicable to the type of Telecommunications Facilities being installed and Pierce County's "Manual on Accommodating Utilities in Pierce County Right-of-Way". B. A franchisee with written authorization to install Overhead Facilities shall install its Telecommunications Facilities on pole attachments to existing utility poles only, and then only if Surplus Space is available. Installation of new poles may be approved by the County Engineer on a case by case basis. C. Whenever all existing telephone, electric utilities, cable facilities and Telecommunications Facilities are located underground within Rights-of-Way a restricted franchisee with written authorization to occupy the same Rights-of-Way must also locate its Telecommunications Facilities underground. D. Whenever all new or existing telephone, electric utilities, cable facilities and Telecommunications Facilities are located or relocated underground within Rights-

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	of-Way, a franchisee that currently occupies the same Rights-of-Way shall concurrently relocate its facilities underground at its expense. **12.34.730 Conduit Occupancy.** In furtherance of the public purpose of reduction of right-of-way excavation, it is the goal of the County to encourage both the shared occupancy of underground conduit as well as the construction, whenever possible, of excess conduit capacity for occupancy of future Right-of-Way occupants. Therefore, if a franchisee is constructing underground conduit for its own Telecommunications Facility, and the County reasonably determines such construction is in an area in which another Telecommunications Provider(s) may also construct Telecommunications Facilities in the future, the County may require the franchisee to construct excess conduit capacity in the Right-of-way, provided the expense of such excess capacity shall be borne by the County (calculated as the difference between what franchisee would have paid for the construction of its conduit and the additional cost only of the excess conduit). **12.34.735 Franchisee Occupancy of County Owned Conduit.** If the County owns conduit in the path of Franchisee's proposed Telecommunications Facilities, and provided it is technologically feasible for Franchisee to occupy the conduit owned by County, Franchisee shall be required to occupy the conduit owned by the County in order to reduce the necessity to excavate the Right-of-way. Franchisee shall pay to the County a fee for such occupancy which shall be the cost Franchisee would have expended to construct its own conduit from the outset, as certified by the Franchisee's engineer and approved by the County Engineer. The County and the Franchisee may agree to amortize the fee through annual payments to the County over the term of the Franchise, including the time value of money." Pierce County, Washington, Ordinance No. 96-1224, §§ 12.34.725, 12.34.730, 12.34.735. (http://www.mrsc.org/ords/p5-96124.aspx)
Washington (Poulsbo)	"Whenever conduit installed or to be installed under this Section is available or will become available within a newly constructed public street or right-of-way upon dedication, all telecommunications service providers thereafter locating telecommunication lines within such street or right-of-way shall be required to locate their communication lines within such conduit unless it can be demonstrated to the reasonable satisfaction of the City Engineer that such location is not technologically feasible or reasonably practicable. Conduit capacity shall be allocated to telecommunications service providers on a first-come, first-served basis, provided, that the City may reserve capacity within such conduits for its own use and provided further, that the City Engineer may adopt additional rules for conduit allocation in order to ensure that all telecommunications service providers have reasonable access to the City's rights-of-way and that no barriers to entry or competition result from the allocation of conduit space." City of Poulsbo, Washington, Ordinance No. 2003-25, § 12.02.015(E). (http://www.mrsc.org/Ords/P58o2003-25.pdf)
Washington	"Grantee may make excavations in Rights-of-Way for any facility needed for the

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(Redmond)	maintenance or extension of Grantee's System . . . . Whenever it is possible and reasonably practicable to joint trench or share bores or cuts, Grantee shall work with other providers, licensees, permittees and franchisees so as to reduce as far as possible the number of Rights-of-Way cuts within the Franchise Area." City of Redmond, Washington, Cable Television Franchise, November 26, 2002, Section 10.1(C). (http://www.ci.redmond.wa.us/insidecityhall/citycouncil/20021203pdfs/iiia1.pdf)
Washington (Seattle)	"Beginning by November 1, 1997, and by October 1 of each succeeding year, the Director of Transportation shall provide to all utilities a list of street and other improvements planned for the following three (3) years . . . . The Director of Transportation shall establish a Utility Coordinating Committee for the purpose of coordinating street and utility projects to minimize the frequency of street openings and disruption to neighborhoods . . . . The committee shall meet at least twice a year to review and coordinate street and utility projects for the next three (3) years. The committee . . . shall not allow pavement cuts within three (3) years after resurfacing or reconstruction." Seattle Municipal Code § 15.32.050(B)-(C). (http://www.cityofseattle.net/transportation/pdf/street.pdf)
Washington (SeaTac)	"In requiring undergrounding of electric and communications facilities, it is the City's intent to authorize and encourage establishment of joint or common trenches, as follows: A. Utilization of a single trench where feasible by all utilities and rights-of-way franchise holders is hereby encouraged and shall be required where ever feasible. Upon application for an underground right-of-way use permit, the City's Public Works Department shall determine whether other utilities and franchise holders have applied, or may be likely to apply on a timely basis, for undergrounding along the same right-of-way and whether the permit, if issued, should require joint use of a common trench. If at the time of application for an underground permit it does not appear that all utilities involved in the undergrounding project have made appropriate arrangements for the use of the common trenches, the Public Works Department may delay the issuance of such permit until all utilities involved in such relocation shall have been given the opportunity to be heard upon two (2) weeks' notice. B. Where new structures require underground services extending into or across the public right-of-way to existing overhead distribution systems for connection, it shall be the responsibility of the property owner, owner's agent or other persons applying for such underground service from an electrical or communications utility to provide adequate provisions and capacity for joint usage in a trench with conduit or other required facilities for present and future service extensions to the structure. The utility, property owner, owner's, agent, or other person, applying for the permit shall notify all other electrical and communications utilities as to the availability of a common trench. The issuance of a permit may be delayed until all utilities involved in a street crossing for underground service connection to a structure have been given the opportunity to be heard upon two (2) weeks' notice. C. Whenever an electrical or communications facility, including but not limited to

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	electrical power, telephone, telegraph, cable television, and fiber optics is required to be placed underground in a joint trench, then the costs of excavation and fill and also the costs of conduit, cable, vaults, and other appurtenant facilities shall be borne on an equal basis, or as agreed, by the utilities, franchise holders, or others participating in the undergrounding project." City of SeaTac Municipal Code, Ord. 97-1002 § 1, § 11.20.070. (www.seatac.wa.gov/mcode/ordinances/99-1043.htm)
Washington (Spokane)	"Whenever Grantee damages or disturbs any area in or near the public right of way or permitted areas, or plans to do so, Grantee stipulates the City may . . . require Grantee to common trench with any other underground installation in the right of way, with cost sharing to be negotiated between the parties involved, or in absence of agreement, as directed by the Administering Officer . . . Consistent with any general municipal undergrounding policy or program now or hereafter arise, as a condition of Grantee's new installation or major maintenance or restoration construction activities of overhead facilities under their franchise, Grantee agrees to coordinate its underground installation and planning activities with the City's underground plan and policies; provided, in no event shall any third party beneficiary rights be implied or created." Spokane, Washington, Ordinance No. C-32786, Time Warner Telecom of Washington, LLC Telecommunications (Noncable) Franchise, Section 10B. (http://www.mrsc.org/ords/s73-c32786.aspx)
Washington (Tacoma)	"Operators of communications systems must follow City-established requirements for placement of facilities in Public Rights-of-Way, including the specific location of facilities in the Public Rights-of-Way, and must in any event install facilities in a manner that minimizes interference with the use of the Public Rights-of-Way by others, including others that may be installing communications facilities. The City may require that facilities be installed at a particular time, at a specific place, or in a particular manner as a condition of access to a particular right-of-way; may deny access if an Operator is not willing to comply with the City's requirements; and may remove, or require removal of, any facility that is not installed in compliance with the requirements established by the City, or which is installed without prior City approval of the time, place, or manner of installation and charge the Operator of the facility for all the costs associated with removal; and may require a Person using the rights-of-way to cooperate with others to minimize adverse impacts on the rights-of-way through joint trenching and other arrangements." Tacoma, Washington, Ordinance No. 26053, § 16.01.6.2.3. (http://www.mrsc.org/ords/T3o26053.aspx)
Washington (Vancouver)	"Prior to beginning any construction, Grantee shall provide Grantor with a construction schedule for work in the streets. All construction shall be performed in compliance with this Agreement and all applicable City Ordinances and Codes. When obtaining a permit, Grantee shall inquire in writing about other construction currently in progress, planned or proposed, in order to investigate thoroughly all opportunities for joint trenching or boring. Whenever it is possible and reasonably practicable to joint trench or share bores or cuts, Grantee shall work with other providers, licensees, permittees and franchisees so as to reduce as far as possible

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	the number of street cuts." Cable Television Franchise Agreement Between the City of Vancouver, Washington, and TCI of Southern Washington, December 1997, § 10.1(B). (www.ci.vancouver.wa.us/vandis/final/sec10.htm)
Wisconsin (Deerfield)	"Unless a waiver is received from the Village Board, transmission lines below ground level, which are constructed or replaced, shall be placed in a common trench. For purposes of this section, the term "transmission lines" shall mean any wire or coaxial cable used for the transmission of electrical energy, radio or television signals, or telephone or other voice communication and any equipment appurtenant thereto." Deerfield Code § 5.13. (www.deerfieldwi.com/chapter_05.htm)
Wisconsin (Milwaukee)	"e. Each cable system operator shall utilize existing poles, conduits and other facilities whenever possible and shall not construct or install any new, different or additional poles, conduits or other facilities until the written approval of the public works commissioner is obtained." Milwaukee, Wisconsin, Code of Ordinances, Chapter 99, Cable Systems, Section 99-8-5-e. (http://www.ci.mil.wi.us/citygov/council/cable/MilwCh99.doc)
Wisconsin (Stevens Point)	"Franchisee shall utilize existing poles and conduit wherever commercially reasonable, and shall at all times comply with all applicable code requirements." Cable Communications Franchise Agreement between Charter Cable Partners, LLC and the City of Stevens Point, Wisconsin. (http://stevenspoint.com/code/chapter17.html)
Wyoming (Sheridan)	The Franchising Authority "may require Grantee to cooperate with others to minimize adverse impacts on the Public Way through joint trenching and other arrangements." Sheridan, Wyoming, Ordinance #1915, Section 3. (www.city-sheridan-wy.com/ordsupps/ord1915.pdf)

ATTACHMENT C

Washington
UT-023003
ATT/XO 01-005

INTERVENOR: AT&T Communications of the Pacific Northwest, Inc. and XO Washington, Inc.

REQUEST NO: 005

Please provide service type counts, by CLLI for the categories identified below. The intent of this request is to obtain service counts related to **ALL** loops that are part of Qwest's outside plant regardless of tariffed service type (i.e., regardless of whether the loop is Qwest retail service, private line, special access, Official Company Service, UNE, wholesale, etc.).

a. Switched Basic Residential lines (all voice grade service lines including retail, UNE (all types including UNE-P) and resale and including lines with line shared DSL service)

b. Switched Basic Business lines (all voice grade service lines including retail, UNE (all types including UNE-P) and resale and including lines with line shared DSL service)

c. Business switched DS-0 lines

d. Switched business DS-1 lines (or equivalent -- HDSL)

e. Payphone lines

f. ISDN-PRI lines

g. ISDN-BRI lines (or equivalent IDSL)

h. Non-switched DS-0 or lower and analog voice grade lines

i. Non-switched UNE-L lines (including DSL lines that do not carry a switched voice channel except HDSL)

j. Non-switched DS-1 lines (or equivalent -- HDSL)

k. Non-switched DS-3 lines

l. PBX trunk

m. OCn

n. Other (with a basic service description)

RESPONSE:

Please see Confidential Attachment A.

Respondent: Rex Morse

Geoff Murphy

ATTACHMENT D

Data Request 005:
Please provide service type counts, by CLLI for the categories identified below. The intent of this request is to obtain service counts related to ***ALL*** loops that are part of Verizon's outside plant regardless of tariffed service type (*i.e.*, regardless of whether the loop is Verizon retail service, private line, special access, Official Company Service, UNE, wholesale, *etc.*).

a. Switched Basic Residential lines (all voice grade service lines including retail, UNE (all types including UNE-P) and resale and including lines with line shared DSL service)
b. Switched Basic Business lines (all voice grade service lines including retail, UNE (all types including UNE-P) and resale and including lines with line shared DSL service)
c. Business switched DS-0 lines
d. Switched business DS-1 lines (or equivalent -- HDSL)
e. Payphone lines
f. ISDN-PRI lines
g. ISDN-BRI lines (or equivalent IDSL)
h. Non-switched DS-0 or lower and analog voice grade lines
i. Non-switched UNE-L lines (including DSL lines that do not carry a switched voice channel except HDSL)
j. Non-switched DS-1 lines (or equivalent -- HDSL)
k. Non-switched DS-3 lines
l. PBX trunk
m. OCn
n. Other (with a basic service description)

RESPONSE:
Please see the attached confidential document, WA UT_023003 DR 5.xls, detailing the October 2002 access lines.

Prepared by: Ross Riddles - Manager-Fin'l Plng & Analysis